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NEW SERIES—VOLUME 48, PART 6
1958

PRELIMINARY ARCHAEOLOGICAL INVESTIGATIONS IN THE SIERRA DE TAMAULIPAS, MEXICO

RICHARD S. MacNEISH
National Museum of Canada

THE AMERICAN PHILOSOPHICAL SOCIETY
INDEPENDENCE SQUARE
PHILADELPHIA 6

DECEMBER, 1958

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OF

The American Philosophical Society

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Library of Congress Catalog
Card No. 58–14489

PREFACE

It seems inevitable that the sober-sided mores of the academic profession, combined in most instances with a lack of time and talent, must render an archaeological report a dull affair. Certainly work in the field is anything but that. During the twenty-one months (three seasons: 1945–1946, 1948–1949, and 1953–1954) spent in the field in the state of Tamaulipas, Mexico, I enjoyed the friendly and helpful citizens, the superb scenery, and balmy weather, and the excitement of making new "finds" in this archaeologically unknown region. Even those aspects of the field work that wrung bitter cries from me at the time—the formidable terrain that made for rugged working and traveling conditions, inadequate equipment, and a rapidly sinking exchequer, armies of *garrapatas*, *pinolillos*, *niguas*, and other biting and burrowing insects—all seem downright pleasurable in retrospect. Every artifact, stratum, site, place name, and bit of work mentioned in the report is linked with circumstances that somehow can be recalled with a warm and pleasant feeling. All in all this volume represents a number of months of hard physical and mental labor which gave me much pleasure and satisfaction.

Perhaps as enjoyable as the circumstances mentioned above was the chance to wrestle with archaeological problems that seemed to me to have great significance in the prehistory of Meso-America. One of the most important problems tackled was that of the non-ceramic (pre-pottery) cultures in Meso-America. When the survey was first planned in 1944 and begun in 1945, no single expedition in Meso-America had concentrated its efforts on finding sites of Early Man or pre-pottery occupations, though much verbal interest had been expressed concerning these problems.

From an armchair point of view, Tamaulipas exhibited a number of conditions that had promise of possible solution of the problem of early and pre-ceramic man in Mexico. First of all, northern and eastern Tamaulipas seemed to be the southernmost tip of the Great Plains of the United States, which have contributed so many pre-pottery finds. It seemed reasonable that some of the "early men" of the Plains may have passed through the funnel made by the Great Plains and poured out at its tip into Tamaulipas. Secondly, reports of Pleistocene fauna and evidence of terraces that might be early post-Pleistocene were common in Tamaulipas, and thus there was hope that archaelogical assemblages could be found in good early geological contexts. Thirdly, Tamaulipas was cut by many arroyos, the vegetation in various parts was thin, and on the eastern edge of the sierras inhabitable dry rock shelters were present. Lastly, from Tamaulipas had come reports of non-pottery sites near large ruins. There was, of course, the possibility that these non-pottery sites were in reality pre-pottery sites. This matter certainly seemed worthy of investigation as here might be found representatives of the developmental stages leading to Meso-American "high culture."

The three seasons' field work in Tamaulipas reported in this publication by no means solved all the problems concerning Early Man, pre-pottery cultures, or the development of civilization in even one small part of Meso-America. However, it is at least a start toward the solution of some of those problems. Thus this report is far from being final. It is in reality but a brief and provisional introduction to the archaeology of Tamaulipas and the problem of how civilization rose and fell there (which, I hope, may have some bearing on the question of how and why civilization rises and falls anywhere).

In the survey and, later, the excavations, my wife, June Helm MacNeish, was my constant companion and colleague. Without her moral support and assistance I am sure the first expedition would have ended early, and the second and third would never have begun.

In addition to the assistance my wife gave, I received help from other sources. Dr. Fay-Cooper Cole, then Chairman of the Department of Anthropology of the University of Chicago, sponsored in part the first season's field work in 1945–1946. The second, in 1948–1949, was sponsored by the Viking Fund (now the Wenner-Gren Foundation for Anthropological Research) of New York City. Indirectly, there was also sponsorship by Jean M. Rand and by the International News Service (which paid for a somewhat racy and garbled story of the sequence of culture in Tamaulipas, thereby keeping the expedition going during the last month of the 1949 season). The 1953–1955 seasons were financed by the American Philosophical Society, the American Academy of Arts and Science, the De Kalb Seed Company, the Guggenheim Foundation, and the Department of Botany of Harvard University. I am grateful to all of them for their aid.

In the field, it was Señor José Martinez y Martinez who, in 1945, first told me of the ruins and caves in the Sierra de Tamaulipas, and it was Pedro Lerma who was my intrepid, and sometimes cheerfully bibulous, guide to all the ruins and caves. These are the real discoverers of the sites in the Sierra de Tamaulipas, and I am most grateful to them.

Señores Roberto Pavon, Alberto Aguilar, and Leonardo Ponce, of Panuco, Vera Cruz, and James Garner of Austin, Texas, were my chief assistants during the first excavations. Numerous citizens of Los Angeles, Tamaulipas, did the 1949 digging, often under very adverse conditions. During the 1954 season Peter Pratt of Toronto, Ontario, Canada, and Peter Grant of Winnipeg, Manitoba, Canada, assisted with the survey and excavation, and the citizens of Almagre Ranch furnished the guides and labor. I should like to express here my appreciation of their efforts.

I should also like to thank Dr. T. N. Campbell of the Department of Anthropology of the University of Texas, Dr. Alex Krieger, Glendale Museum, and Dr. Paul Fejos of the Viking Fund (now the Wenner-Gren Foundation for Anthropological Research) for the use of equipment, as well as Director J. Mireles of the Escuela Rural of Ciudad Victoria, Tamaulipas, Dr. Rubin de la Borbolla, then of the Museo Nacional of Mexico, and Dr. Alex Krieger, then in charge of the laboratory of Anthropology of the University of Texas, for providing a place in which to undertake the analysis of my archaeological materials.

Technical assistance and advice came from a number of sources, and I should like to express my gratitude to each of them. Dr. Helmut de Terra, then of the Viking Fund, Dr. Glen Evans, then of the Texas Memorial Museum, and Dr. R. de Wit, formerly of the Geological Survey of Canada, studied the geological aspects of the Canyon Diablo. Dr. Paul C. Mangelsdorf of the Botanical Museum of Harvard University and Mr. C. Earle Smith studied the rich floral remains from La Perra Cave. Dr. C. Hibbard of the Museum of Paleontology of the University of Michigan, and Dr. Austin Cameron of the National Museum of Canada examined and identified the faunal remains found in excavation. For advice and counsel in my study of the material I am indebted to Dr. Alex Krieger and Dr. J. Charles Kelley, formerly of the Department of Anthropology of the University of Texas, Dr. Douglas Leechman, formerly of the National Museum of Canada, Dr. J. B. Griffin, of the Museum of Anthropology of the University of Michigan, David Kelley of Cambridge, Massachusetts, Dr. A. V. Kidder, formerly of the Carnegie Institution of Washington, to Señores W. Du Solier, Pablo Martinez del Rio and Pedro Armillas, all formerly of the Escuela de Antropología of Mexico, and to Dr. Eduardo Noguera formerly of the Instituto de Antropología e Historia of Mexico.

In the preparation of the manuscript I was assisted by the artist, A. E. Ingram, photographer, E. Elliot, and the stenographers, Mrs. G. MacQuarrie and Mrs. V. M. Atkinson, all of the National Museum of Canada. I should like to take this opportunity to thank them all.

Last, but far from least, I should like to express my deepest gratitude to Dr. Eduardo Noguera and Dr. I. Marquina, formerly of the Instituto de Antropología e Historia, as well as to the Department of Public Education and the Government of the Republic of Mexico, for allowing me the privilege of conducting research in their country, a veritable treasure-house for the archaeologist.

R. S. MacN.

PRELIMINARY ARCHAEOLOGICAL INVESTIGATIONS IN THE SIERRA DE TAMAULIPAS, MEXICO

RICHARD S. MACNEISH

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I. INTRODUCTION

1. PROBLEMS AND METHOD

Any statement on the methods or specific problems of an archaeologist should, I believe, be prefaced by a precise statement of his purposes (other than personal satisfaction) in undertaking field research.

To me, the ultimate ends toward which archaeological investigations can contribute are generalizations about cultural change or cultural process. At the present moment, I can see two kinds of generalization to which the archaeologist may contribute. One would comprise broad statements about cultural growth, based upon comparisons of cultural sequences throughout the world. Into this category would fall Childe's various statements about universal evolution [1] and White's generalizations about energy and culture.[2]

The second kind of generalization for which archaeologists might strive is what Steward has called "laws of multilinear evolution." [3] These laws would be more specific in that they would attempt to give generalizations about the evolutions or developments of certain cultural types under certain specific conditions. Steward has stated that the method should be broadly comparative, superficially like that of the approach to universal evolution.[4] He has suggested that, first, a whole series of historical reconstructions be examined for parallel cultural developments. Once these have been found in a number of different (preferably independent) areas, it is suggested that one should attempt to classify the various segments of the developments into types and to determine the etiology of such functional types. He believes it will then be possible to make generalizations concerning specific kinds of developments, cultural changes, or evolutions under given sets of circumstances.

As is readily apparent, attempts at either level of generalization must have for comparison a series of historical reconstructions. Thus, I believe the secondary purpose of archaeology is "the reconstruction of the life of the people in the past and the arrangements of this life into a historical development." [5] Such a historical reconstruction not only is necessary for any comparative study, but is worth while for its own sake. Furthermore, it also may be of use in explaining ethnographic phenomena and in checking ethnological conclusions about the histories of living peoples.

As is perhaps obvious from the definition of a historical reconstruction, there are two general approaches to this problem. Though I shall describe them separately, they often go hand in hand in the analysis of archaeological materials.

One has been called the conjunctive or integrative approach.[6] In this, one attempts to interpret and make inferences concerning artifacts and other human re-

[1] Childe, 1944 and 1951.
[2] White, 1943.
[3] Steward, 1953.
[4] Steward, 1949.
[5] Vaillant, 1930: 9.
[6] Taylor, 1948.

mains in the light of ethnological information and social anthropological theory so that as complete as possible a reconstruction of the life of a past people may be obtained.[7] Inferences are made concerning the contacts and connections of the reconstructed cultures in time and space.

The other approach may be called the chronological approach. In this, one attempts to arrange the artifacts and human remains so as to show cultural development or change through time and relationships in space.[8] The first step in this procedure is the arrangement of excavated archaeological objects in sequential order. This chronology may be based upon absolute dates (through dendrochronology, Carbon-14, etc.) or relative age derived from stratigraphy (cultural or geological), seriation, paleontological and geological context, and other such aids. Once these raw excavated data are placed in chronological order, it is next necessary to arrange the artifacts into types and to segregate complexes of these types into tempero-cultural segments empirically useful for indicating sequence or change of cultural assemblages. Finally, by comparisons within the sequence and of this sequence with others, it may be possible to indicate cultural relationships in both time and space.

These historical reconstructions, for the most part, are based on excavated materials. Thus the next purpose of archaeology is to obtain the archaeological record. Since part of this is destroyed in excavation, there should be no need to emphasize the importance of excavating carefully and of recording the finds fully and accurately.

Let us now consider the problems I propose to deal with in Tamaulipas. First, I wished to view as many sites as possible so that the ones most likely to give long full sequences of culture could be selected and excavated. Secondly, in order to make a fairly complete reconstruction of history, I hoped to obtain from excavation of the best sites a long sequence of cultures, with each stage in the sequence documented with abundant materials. Thirdly, I hoped to establish the relationships or developments within the Tamaulipas culture sequence and to determine the cultural relationships between cultures in this sequence in Tamaulipas with others in adjacent regions. Finally, I wanted to compare the developments of all or parts of the Tamaulipas sequence with other independent cultural developments to see whether generalizations could be made about certain features of cultural change or cultural evolution.

With this statement of my views on the purposes of archaeology in general, and the broad archaeological problems in Tamaulipas, the methods used to solve my particular problems may now be described.

The first season, from November 20, 1945, to May 26, 1946, was primarily one of reconnaissance. From December 20, 1945, to April 2, 1946, my wife and I endeavored to find sites in northeastern Tamaulipas, north of the Soto la Marina River and east of the Ciudad Victoria–Matamoros highway. Many of the seventy-seven sites we found were shown to us by local people from the small towns and ranches which we visited in our car. Others we happened upon by ourselves. In most cases it was necessary to visit these sites on foot or on horseback or by boat. In all but two instances (Tm c 34 and Tm c 29), only surface collections were made from these sites.

At this time a system for the survey was established. Sites, as they were found, were given a tripartite enumeration. The first part was "Tm" standing for Tamaulipas, the second, "c" for camp, or "r" for ruin; and the third was a number indicating the order in which the site was found. After surface specimens were cleaned, the appropriate survey designation was written on them in India ink. Furthermore, a general diary of the survey was kept, in which the locations of sites were recorded. Thirdly, five by eight-inch survey cards bearing the site designation in their upper left-hand corner were made for each site: for example, *Site*: Tm c 3 (the third site found, a small camp in Tamaulipas). In the upper right-hand corner was the date of the find: *Date*: December, 1945. Below this designation were five horizontal spaces for information, viz.: (1) Discoverer of the site. (2) Its geographical location. (3) Cultural affiliations. (4) The artifacts found by surface collection. (5) General topics, such as advisability of excavation and present location of the specimens.

The following example of Tm c 3 will further illustrate how these cards were filled out.

Site: Tm c 3 *Date*: December, 1945.
Found by: J. H. and R. S. MacNeish.
Location: East of Palo-Alto where the Abasolo–Soto la Marina road crosses the Arroyo Cabreas on top of the east side of the arroyo bank, on either side of the road.
Culture: Probably Abasolo Complex.
Artifacts: One Matamoros Triangular and one San Fernando Stemmed projectile point, a fragment of a muller, and two small plano-convex end-scrapers. Chips and artifacts over area 50 by 20 yards.
Comments: Too small to dig, cultural layer only 1 inch thick and badly eroded. Most of the collection was presented to the Laboratory of the Department of Anthropology of the University of Texas, Austin, Texas.

Copies of these survey cards, a map showing the location of the sites, and a copy of the diaries have been presented to the Instituto de Antropología e Historia in Mexico City. I have kept two copies: one in the Canadian Museum of Human History and the other for use in the field.

After the initial survey on the coast had been made and a system for recording the archaeological reconnaissance established, archaeological exploration of the northern Sierra de Tamaulipas was undertaken on foot in April, 1946. At this time, accompanied by Pedro

[7] Willey, 1943.
[8] *Ibid.*

Lerma (guide) and Roberto Pavon (assistant), I visited thirteen more sites, which brought the total for Tamaulipas to ninety. As most of these sites were covered by dense vegetation and as the small amount of surface material was badly water-washed, it was necessary to sink small test holes in each.

The location of these sites was recorded in the manner previously described, but a system of cataloguing the excavated artifacts had to be improvised. This was done by adding a serial number under the survey designation, the meaning of which was recorded in our daily diary. For example, to take a specimen at random, one bears the number Tm r 86/1. This number is also recorded in the catalogue. It signifies that the specimen is of the second group of artifacts uncovered at that site, coming from Square 0–0, Level 2, four to eight inches below the surface in the upper refuse, and not associated with any archaeological feature in the ruin Site Tm r 86. This system was used for all the materials I excavated in Tamaulipas. The technique for excavating and the method of recording were much the same as in my later, more intensive excavation, and will be explained later in this section.

In May of 1946, after the field season was over, I was most fortunate in being able to study the Anderson Collection from Cameron County, Texas, and northeastern Tamaulipas. The artifacts in this collection were already numbered and catalogued. When in the field in early December of 1945 and later in March of 1946, I verified the location of twenty-four of the sites that Anderson had discovered. I then went over his catalogue of sites in northeast Tamaulipas and found that there were materials from seventy sites that I could definitely locate. These were given a survey designation, and survey cards were made for them. This brought the total number of sites in the survey to 160.

Jack Hughes had made a survey along the Ciudad Victoria–Matamoros highway in late December of 1945, and the materials from eleven sites were available. These sites also were given survey numbers, and survey cards were made for them. I might add I surveyed all of them in 1948.

Thus, by May of 1946 archaeological materials were available from 171 sites in Tamaulipas. To establish, in a preliminary way, what artifact types existed and what the artifact complexes were, and to determine which sites were most suitable for excavation, an analysis was then made.

This analysis, which started in 1946, continued in 1947. A preliminary report was published in *American Antiquity*, July, 1947,[9] and a more comprehensive statement was included in my doctoral dissertation submitted around the same time, to the University of Chicago.[10] As the analysis and conceptual tools employed in handling the survey materials were much the same as those used for the excavated materials, I shall pass over them here and explain them in some detail in a later section of this chapter. The analysis, however, did reveal that the Canyon Diablo area had a series of sites with and without pottery and that the chance of finding a long sequence from pre-pottery to ceramic to historic horizons was fairly good.

Thus in November of 1948, excavations began. The place chosen to excavate first was just north of Panuco, Vera Cruz. Ekholm had worked and established a sequence of six periods, which he had tied into the general cultural developments of Meso-America; I hoped that I might be able to tie in my pottery periods of the Sierra de Tamaulipas with his. Secondly, Roberto Pavon had told me of a series of thick stratified sites that had Chila Period I deposits on their surfaces or in their upper layers, and it was hoped that pre-pottery artifacts like those in the Sierra de Tamaulipas might occur in the lower layers. To find pre-pottery was thus the main purpose of these excavations. In this, we were unsuccessful. The layers below the Chila Period I deposits yielded about 18,000 specimens, but all belonged to three earlier ceramic periods that could not be connected with the Sierra de Tamaulipas remains. For this reason the report on these excavations is not included here but has been published by the American Philosophical Society as a separate paper.[11]

During the last week of December we left Panuco for the Sierra de Tamaulipas. Before entering the Canyon Diablo we tested an early ceramic site (Tm c 172) of the "Pueblito culture" along the southwest border of the Sierra de Tamaulipas. It was a single period site and gave us a fair sample of the Laguna Phase (then called early Pueblito I) from a "pure" site, which supplemented our knowledge of the sequence of pottery cultures and also gave data for correlating the earliest ceramic remains with those of the Huasteca and the Valley of Mexico. Then we plunged into the Canyon Diablo.

During most of the month of January we excavated Tm c 81 and spent part of February testing it and Tm c 82 and Tm c 83. Most of March was spent in digging Tm c 174. During our 1949 stay in the Sierra de Tamaulipas further surveying was done by my party, and twelve more sites were discovered. The rest of the season was spent digging sites on the coast, though three more trips were made into the Canyon Diablo.

In 1954 we returned to southern Tamaulipas for further excavation and survey. The reconnaissance increased the number of sites to 346. During this season most of the excavations were in the Sierra Madre of southwestern Tamaulipas, but Tm c 314 and Tm c 315 were excavated in the southern Sierra de Tamaulipas.

In all excavations the technique was generally the same. First of all, a five-foot square, oriented along the cardinal axis, was sunk into the site to determine

[9] MacNeish, 1947.
[10] MacNeish, 1948.
[11] MacNeish, 1954.

the depth of refuse, the strata, the types of cultural material, and the general character. In a few cases, a number of five-foot squares were dug. On the basis of the materials from these tests and from the surface collections, a decision was made on the possible worth of intensive investigation. Whether the sites had good stratigraphy and large amounts of materials and were fairly accessible and, later in the investigation, whether they had particular cultural complexes that would fill gaps in our sequence, were factors of paramount importance.

Once it had been decided to excavate a site, part or all of it was staked off in five-foot squares oriented along the cardinal axis. One of the stakes fairly near the centre of the excavation was designated the 0-0 stake. The stake five feet to the north of the 0-0 stake was called North-Five or, in abbreviated form, N5; a stake ten feet north of the 0-0 axis was called N10, while a stake five feet west of 0-0 was called W5, etc. Thus all stakes had a particular number, and each five-foot square, surrounded by four numbered stakes, was named after the square in its southeast corner. For example, the square surrounded by stake 0-0, N5E5, N5, and E5 was called E5 or East-Five.

Next, the alidade and plane table were set up outside the staked area, and a datum plane was established well above the highest point of the site. Datum depths were then taken on all the stakes as well as at any sharp breaks in contour outside the staked area. From these datum depths it was possible to make a one-foot contour map of the site and draw the outlines of profiles along every five-foot line of stakes. Both were drawn on graph paper on a scale of one foot to one inch. A series of photographs was taken of the site before excavation: from close up, so that the picture of features or the profile delineated by excavation might be compared with the undisturbed area, and from some distance away, so that the site might be seen against its broader geographical and geological background.

Once this preparatory work was completed, we were ready to excavate. Exactly how we dug at each site varied somewhat with the local situation and will be explained in more detail in the site reports. Generally speaking, the preliminary five-foot test was done with a shovel and screen, and the square was removed in six-inch levels; the materials were sacked accordingly, unless definite soil breaks or features were encountered. Phenomena such as these were always excavated by trowel and brush. In the main excavation more care was taken, and alternate five-foot squares of alternate trenches were usually excavated first. The technique of alternate squares was used so that all profiles at all five-foot axes could be seen and recorded on the cross-section drawings. Later, the adjacent five-foot squares between those dug were removed to form trenches. This allowed long profiles to be drawn and photographed. In the actual digging of the squares, the technique varied. When dealing with strata over six inches in thickness without discernible bedding or with grey powdery cave-fill, squares were dug in arbitrary six-inch levels by peeling off vertical slices by shovel and attempting to leave artifacts or cultural features *in situ*. The peeled-off material was then put through a quarter-inch mesh screen. When discernible strata were visible, a trowel was used for excavation, but the excavated back-fill was still put through a screen. Whenever cultural features were encountered, they were first cleaned off and recorded (and photographed) and then excavated by trowel and recorded (and photographed) at various stages during their excavation.

This brings us to a part of archaeological activities as important as the digging itself, viz.: the recording. In the excavation of the squares, materials from each level or from features of each square were placed in cloth sacks as soon as they were found. These sacks had a tag inside and another outside bearing, in India ink, the exact location of the site, square in the site, level in the square in terms of surface depth or datum depth, features, and strata. Occasionally artifacts of some importance were placed inside the sacks in paper bags with their exact location noted, both horizontally and vertically. To guard against possible mixing of the materials in the bags owing to accidents in the field, a conscientious effort was made to wash, number, and catalogue all the specimens obtained at the end of each week. As well as being a safety precaution, this practice allowed us to use the same bags over and over, for in northern Mexico cloth bags were both expensive and difficult to find.

During the digging, a daily record was kept of our excavation data. Recorded in this diary were the digging techniques used at specific times and places; a description of each square, giving locations of artifacts, strata, features, and any other matters; descriptions of any features found; details of the stratigraphy and the strata; on-the-spot interpretations and speculations about the excavations or excavated material; a catalogue of the photographs, and various other bits of information.

As each feature was encountered, horizontal and vertical measurements were taken and drawings made on graph paper. Furthermore, when squares were completed, their particular profiles were drawn on the sketches of the cross-section of the site, which had been prepared during the surveying and staking. Perhaps more important than the drawings and sketches were the photographs. At least one profile (and sometimes two, along both the east-west and north-south axes) through the entire site was photographed, as a whole or as a panorama. All features were photographed, and attempts were made to take a picture of a feature before excavation, during excavation, and after excavation. Snapshots were also taken of the various excavation

techniques, progress of the excavation, and other items that seemed worth recording.

When the last artifact had been recovered and the last field note taken, a field analysis of the material was made. The first step was to set up the chronology of the artifacts and to present this in some coherent form. To attain this end a useful tool was found in the concept of an artifact type, considered to be a group of man-made objects exhibiting interrelated similar features having temporal or spatial significance.[12]

In setting up the types, various artifacts from the sequential levels, layers, or strata of an excavated site were first laid on a large table and compared. Next, those artifacts showing very similar forms, dimensions, and techniques of manufacture were grouped together as trial types in each level of the site. This same process was then repeated for each level of every site, and the results were compared. Two trial types with similar features and similar percentage trends through the levels of two sites were lumped together into one type; a trial type with different percentage trends at two sites was re-defined as two types, and a trial type evincing the same percentage trends in its several sites was left alone. These manipulations, re-defining the trial types, were continued in studies of the other excavated sites. Then the survey sites were compared. As a result the artifacts were classified into a number of types that not only marked the time but also showed their geographical distribution.

Assuming that types were invented, prospered, and eventually died out, it then became possible to take the trends manifested in the best stratified site, Tm c 81, and interdigitate the sequential layers of other sites in such a position that a more detailed and complete picture was gained of the trends through time. In like manner, it was also possible to arrange the surveyed sites in a tentative chronology. Such a process was a combined use of typology, stratigraphy, and seriation. The results of these studies not only showed the sequence of types but also indicated the sequential congeries or clusterings of types that occurred in the various levels or layers of various sites. The complexes, congeries, or clusters, belonging to these various levels or layers of excavated sites, are here called components, while complexes of types from unexcavated sites (surface collections) are merely called site collections. From the standpoint of description and organization, it was necessary to classify these components with identical or very similar congeries of types into convenient units. Such a unit I have called a "phase." To distinguish the various phases one from the other, I have used a binomial term, the first part of which is a proper name (usually the name of the site at which such a congeries of types was first found), and the second part the term "phase." I have assumed that a phase represents the preserved material remains of a single group of people at what, for heuristic purposes, is considered a moment in time (or, more realistically, a limited span of time within which neither very many nor very significant changes can be discerned). I have used the term or concept "phase" for my smallest classificatory division in preference to a number of others (such as facies, focus, period, culture, numbered period, aspect, and pattern), as it has been used fairly consistently to represent the artifact assemblage of one group of people at one time period.[13] Such a term does not take out of the archaeological literature a useful noun. A second classificatory term is "complex" which I apply to a congeries or cluster of types that occurs in a number of site collections (non-excavated sites). Like the phase, a convenient proper noun has been affixed to the term "complex" to distinguish each one. In reality my complexes are tentative phases.

Phases and complexes were not lumped into larger divisions. First, I felt I still knew so little of the prehistory of Tamaulipas that I would have almost as many larger divisions as smaller ones. Secondly, I felt that I would be further cluttering up the archaeological literature with terms for genetic relationship which can be just as conveniently stated or indicated by hyphenated phase-names. Perhaps at some later time a need for classification of the phases into larger units will arise, but I can see none at present.

In the analysis, once the phases or complexes had been placed in their relative chronological order by reference to the stratigraphy in the sites, an attempt was made to date them more exactly.

As the latest phase of the Sierra de Tamaulipas could be connected with a historic tribe of that area, it could be dated fairly accurately on the basis of historic records. Fortunately, at Tm c 174, vegetable or carbon specimens were available from three stratigraphic levels (1, 3, and 6), which contained materials belonging to three phases. Some of these specimens were given to Dr. H. de Terra, who was collecting samples for Dr. Libby of the University of Chicago. Using them, Dr. Libby dated the upper two cultures by the Carbon-14 method. Later the University of Michigan dated another specimen from Floor X of Tm c 81.

A study of aberrant or trade materials and a comparison of Sierra de Tamaulipas types with those of other areas indicated connections with horizons in the Valley of Mexico and southwest Tamaulipas, some of which have been dated by Carbon-14. The non-Carbon-14 datings were, of course, not so exact, but they allowed a good estimate of the relative age of my phases.

Although the final datings are considerably less reliable than those arrived at by the above-mentioned methods, they are of some value. They are based upon a study of flora, fauna, soils, and geology of the area and of the sites in the Canyon Diablo in particular. Dr. H. de Terra, formerly of the Viking Fund, and Dr. Evans,

[12] Ritchie and MacNeish, 1949.

[13] Phillips and Willey, 1953: 620.

formerly of the Texas Memorial Museum, visited the Canyon Diablo for a few days. They studied the geology and proferred statements about the possible dates of some of the earlier archaeological components. Dr. de Wit, formerly of the Geological Survey of Canada, made an analysis of soil samples from the cave sites in order to determine the agencies by which these soils were deposited. The bones from various strata were identified by Dr. C. Hibbard of the University of Michigan, and floral remains identified by C. Earle Smith. On the basis of the soil analysis, the identification of geological features of the Canyon Diablo by de Terra and Evans, Carbon-14 dates, and identification of bones, I attempted a correlation of geological periods, climatic periods, and the earlier phases. The various geological estimates from de Terra, Evans, and de Witt are more or less the same, but until an intensive geological study of the Canyon Diablo is made, they must be considered tentative.

Once the phases were defined and a chronology of the phases determined, I attempted to make certain cultural interpretations, which, though highly inferential, I believe to be necessary when one is attempting "to reconstruct the life of past peoples."[14] Here, on the basis of ethnographic information, I tried to determine the uses of the artifacts and the cultural features and to make inferences about the way of life of the peoples who left the artifacts now composing the phases.

Next, I took up the matter of relationships of the phases of the Canyon Diablo with those of cultural units of adjacent areas in an attempt to correlate the Canyon Diablo sequence with those of other areas and to determine spatial relationships. In conclusion, a few comparisons were made with independent sequences which seemed to have developments paralleling some in the Canyon Diablo, and I have suggested a general hypothesis which, as more data accumulate, I hope will become part of a generalization about cultural development. I attempted also to outline the direction that future investigation might most profitably take.

In the report that follows, the discussions have been presented in the following order: Chapter I, section 2, is a consideration of the geography, geology, ethnic groups, and early history of Tamaulipas. Chapter II is a description of the excavated sites with accounts and illustrations of the techniques used, the topography, the strata uncovered, the cultural features, and a listing of what was found. In Chapter III are described the artifact types and their sequences. Chapter IV comprises a summary of the artifact assemblages, a series of comparisons of the Sierra de Tamaulipas sequences with those of adjacent areas, and such conclusions as I feel may be allowed.

[14] Vaillant, 1930: 9.

2. THE AREA

THE PRESENT ENVIRONMENT

The state of Tamaulipas, occupying about 79,602 square kilometers (or about 49,750 square miles) is the northeasternmost state in Mexico. On the north, the Rio Grande separates it from Texas. On its western border is the mountainous state of Nuevo León; to the south it adjoins the state of San Luis Potosí; and in the southeast the Tamesi River separates it from the state of Vera Cruz (fig. 5, p. 20).

From many standpoints, Tamaulipas is a land of contrasts. From east to west, one passes through a series of north-south zones of topography, soils, and geological formations, and from north to south through a series of drainage, rainfall, climatic, and floral, and faunal belts. Since these various zones compose a background for man's activities, it is necessary to examine more closely this environment.

Tamaulipas may be divided into four topographic zones (fig. 1 D).[15] All along the Gulf Coast lie the Coastal Flats, a region which is characterized by sand or silt dunes and a series of shallow muddy lakes surrounded by dunes, or flat and often marshy plains behind the littoral dunes. From Tampico to the mouth of the Soto la Marina River, the southern half of the coast, the strip is only one to three miles wide; from the Soto la Marina to the San Fernando River it gradually widens to between eight and fifteen miles, and along the coast to the Rio Grande it maintains a width of about twenty miles. To the west of the Coastal Flats is the Coastal Plain, a relatively flat area cut by deep arroyos, but which has no lakes and only a few low rolling hills.

Like the Coastal Flats, it is relatively narrow from Tampico to the San Fernando River, but north of that stream it rapidly widens until it includes all of northwest Tamaulipas bordering the Rio Grande. Leaving the Coastal Plain going west, one encounters the Coastal Dissected Peneplain, which rises fairly sharply from the Coastal Plain and is recognizable by its mesas, flat-topped hills, deep valleys, and arroyos, and by its generally irregular terrain. It is a wide area occupying most of the southeast quarter of Tamaulipas, except for the area of the Coastal Plains and Coastal Flats and a small area in the south-central part containing the Sierra de Tamaulipas. North of the Soto la Marina River, the Dissected Peneplain, swinging northwest, occupies the central part of the state and surrounds the San Carlos Mountains. The final physiographic zone is the Montane area. The mountains are situated mainly in the southwest section of the state (the Sierra Madre Oriental), but two small spurs occur elsewhere; one is the Sierra de Tamaulipas in south-central Tamaulipas, and the other is the San Carlos Mountains in the central-northwest of the state.

[15] J. Vivó, 1948.

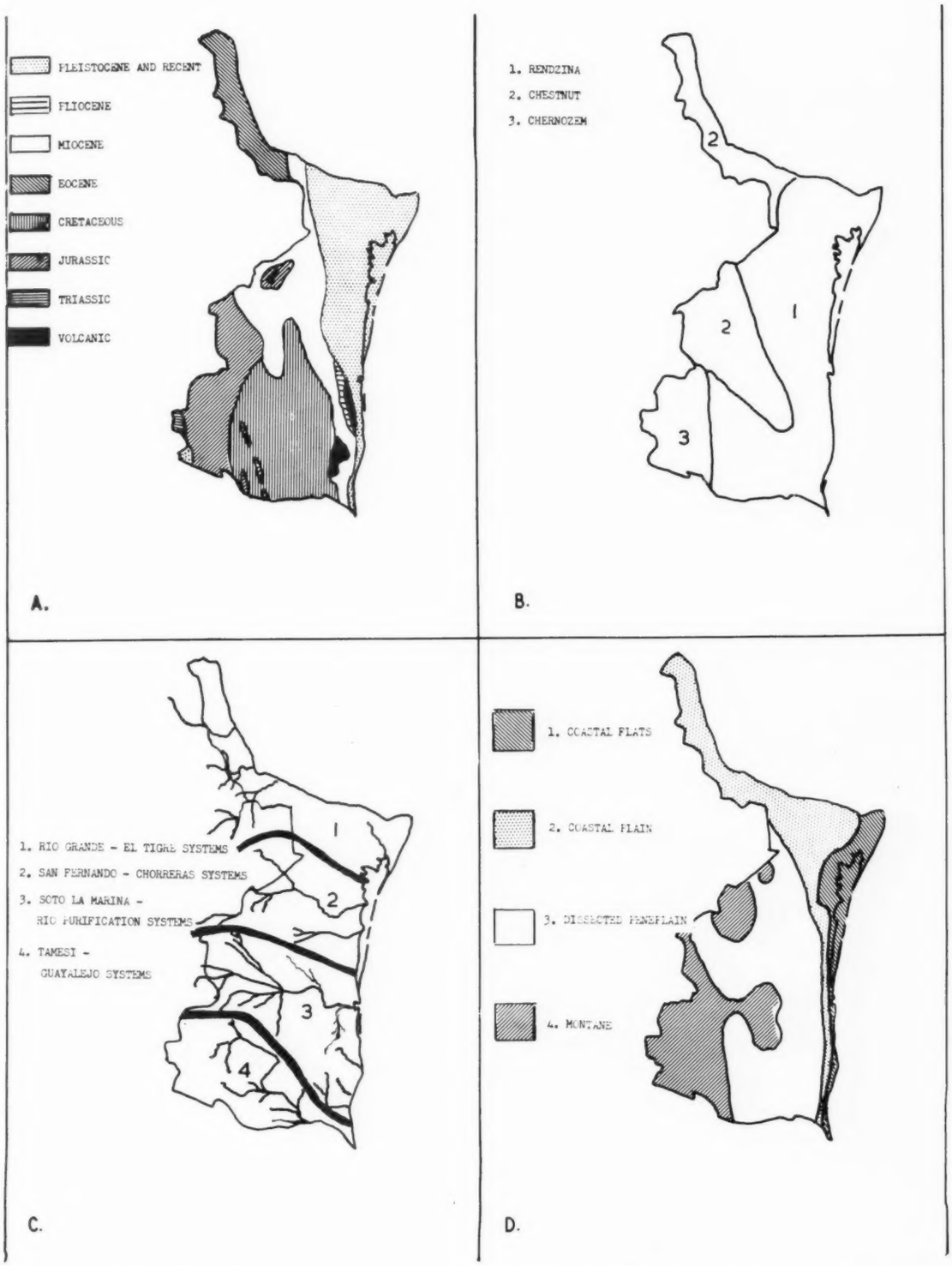


FIG. 1. Physiographic zones of Tamaulipas. A. Periods of geological formations in Tamaulipas. B. Types of soils of Tamaulipas. C. Drainage patterns of Tamaulipas. D. Topographical zones of Tamaulipas.

These topographic zones correlate fairly closely with the superficial geological zones (fig. 1 A).[16] The Coastal Flats and Coastal Plain exhibit shale, sandstone, limestone, clay, sand, and silt, laid down during the Quaternary, except in the northwest spur of Tamaulipas, along the Rio Grande. Exposures in the northwest spur of the state, and in the Coastal Dissected Peneplain, except in the central part of the southeast portion, are mainly Tertiary deposits of limestone or sandstone. The Montane zone and the south-central part of the state are composed of Mesozoic limestones with occasional volcanic extrusions.

Soils follow somewhat the same pattern as the topographical and geological zones (fig. 1 B).[17] The Coastal Flats, Coastal Plain, and Coastal Dissected Peneplain, except the northwest arm of Tamaulipas, contain Rendzina type of soils; the San Carlos and Sierra de Tamaulipas Mountains, the area around Ciudad Victoria, and the northwest arm, Chestnut-type; and the southwest Montane area, Chernozem type of soils.

Bisecting all these features are four major drainage systems, which run roughly from west to east (fig. 1 C). In the north, the Rio Grande and El Tigre river systems meander through mature-cut valleys. Farther south are the youthful rivers of San Fernando and Arroyo Chorreas, whose steep banks drain an area of quick run-off so that their flows show tremendous fluctuation. The Soto la Marina River, which drains the greatest part of Tamaulipas, is much like the Rio Grande and El Tigre Rivers. The southernmost river, the Tamesi, is a wide, mature, meandering stream draining most of southwest Tamaulipas.

From east to west across Tamaulipas are four climatic zones (fig. 2 B). Along the Rio Grande is a narrow strip of Semi-Desert where rainfall usually occurs in the summer and is less than 580 mm. a year.[18] Winds are generally from the east, and the temperature ranges from over 18° C. in the summer to about 5° C. in the winter; only very rarely does frost occur. In other words, it is hot and dry. South of this band to the Soto la Marina River is the Dry Temperate zone of warm temperature ranging from above 18° to 5° C. with about 700 mm. of rain a year. Rain occurs spasmodically throughout the year and from my personal experience most often in May and October. Usually it takes the form of short violent storms, which change the country from dry and dusty to an even worse condition of mud and arroyos filled with raging torrents. South of the Soto la Marina River to the valley of the Tamesi River is the Wet Temperate zone where rainfall occurs mainly in the summer and ranges from 580 to 800 mm. a year. The range in temperature is from above 18° C. in the summer to occasional frosts in the winter. This zone gradually fades into the Southern Tropical zone with rains in the summer, over 1,000 mm. a year, and with a hot climate all year round.

These climatic zones correlate roughly with the Biotic zones (fig. 2 C).[19] Goldman shows the Humid Lower Tropical Biotic sub-zone to extend northward into Tamaulipas in the Tampico region. This area is characterized by tall trees with wide-spreading crowns and with vines clinging to their trunks, an undergrowth of rushes and matted vines, the small Mazama deer, and various arboreal animals. This zone blends into the Arid Upper Tropical Biotic sub-zone that extends up the coast as far as El Moron, across the southern part of the state south of the Sierra de Tamaulipas to the Sierra Madre and northward along the edge of the Sierra Madre in the valley of the Guayalejo almost to Llera. A thin growth of chaparral interrupted by strands of live oak and ojite or areas of guazaba bushes, mesquite, acacias, cacti, and palmetos, covers the area. North of this zone and east of the Sierra Madre to the Rio Grande is the Lower Austral Biotic zone. This region is a scrubby jungle of mesquite, huisache, ebony, yucca, sotal, and cacti, interspersed with grassy areas. Southwest Tamaulipas, in the Sierra Madre, belongs to the Upper Austral zone but the valleys seem to be Lower Austral. These mountains have pines, small oaks, agaves, yuccas, as well as mesquite, acacias, cassias, and cacti.

Combining some of the various zones described above, I have established a series of ecological zones (fig. 2 D) that man did or could adapt himself to in a number of ways. I have called the northwest arm of Tamaulipas extending eastward along the Rio Grande to just east of Matamoros the "Laredo ecological zone." This flat extension of the Coastal Plain has little rainfall (300 to 500 mm.) at any time of the year. Its dryness, its thin humus, its frequent exposures of rock or hard clay, and its sturdy semi-desert vegetation make agriculture without irrigation extremely difficult, if not impossible. Besides, as game was scarce and the rivers had few fish and shell foods, primitive man in this area would have been heavily dependent upon plant food-gathering. Food-gatherers would have had a variety of seasonal plants to choose from, such as the flower of the *pita*, *maguey* roots, *yucca* roots, *sotol*, *tunas*, berries, nuts, and various seeds. Such a subsistence would of necessity make for small groups, nomadic at least seasonally. This plant diet could have been supplemented by game, reptiles, and insects (though the insects I encountered were more likely to have been the eaters, not the eaten). All in all, the energy expended in getting food would certainly have kept the inhabitants from rapidly developing a complex society.

The Rio Grande and the flat surrounding country without any natural barriers certainly offered accessible routes of travel both inside and through the area. However, if we can judge from the meagre historic records

[16] *Ibid.*
[17] *Ibid.*
[18] *Ibid.*
[19] Goldman, 1951.

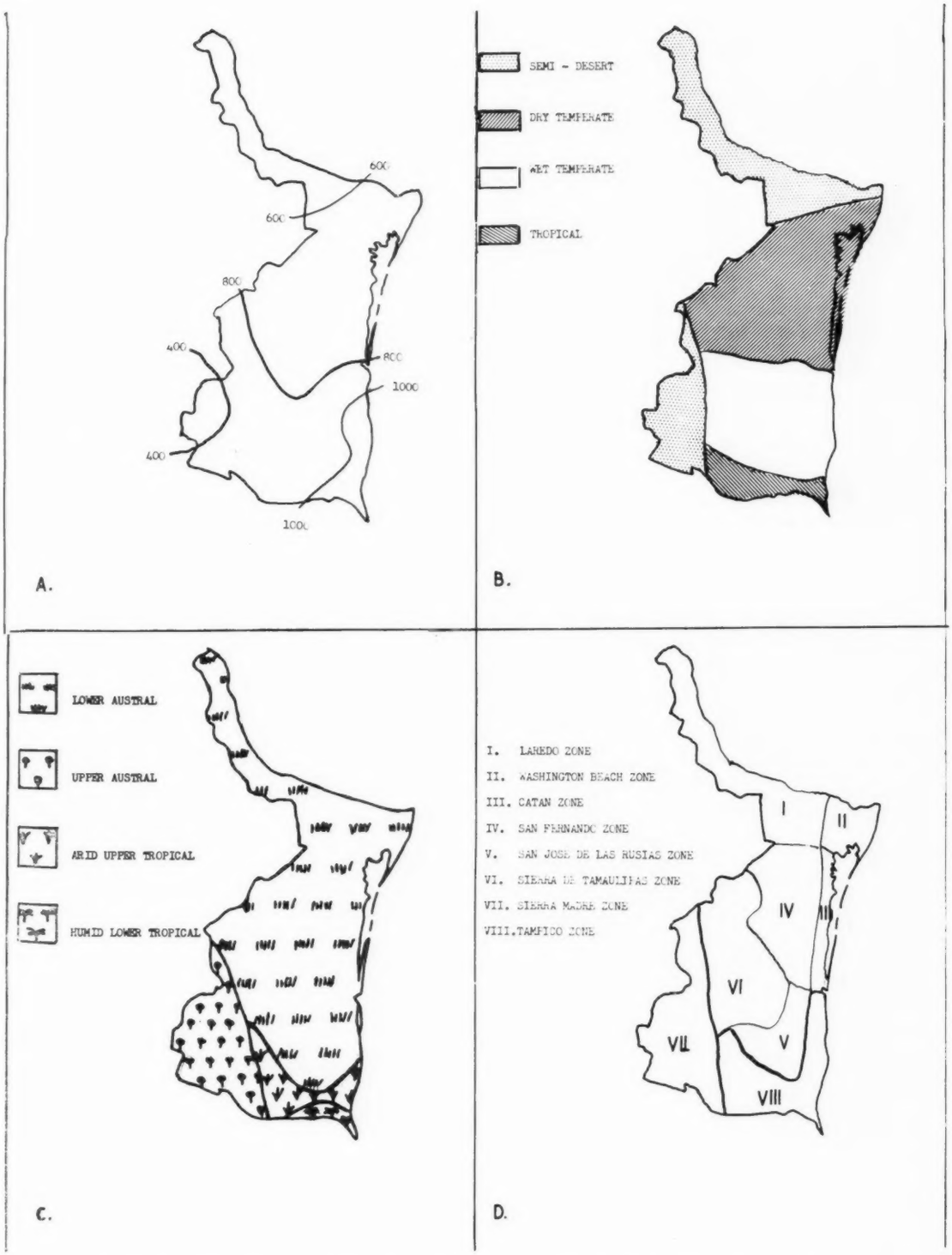


FIG. 2. The natural environment of Tamaulipas, Mexico. A. Annual rainfall in millimeters. B. Climatic zones of Tamaulipas. C. Biotic zones of Tamaulipas (after Goldman). D. Ecological zones of Tamaulipas.

and few archaeological finds, the difficulties of obtaining food seem to have kept this route from being used. The Laredo zone seems to have been an area where the environment not only limited, but stifled, cultural advances and cultural contacts. At historic times only a few bands occupied it, and those had a culture as simple and primitive as any in the New World.[20] The little archaeology done also reveals that pre-historically, cultural changes(at least from the standpoint of artifacts) were extremely slow and material culture inventories very small.

Just east of the Laredo zone is the Washington Beach zone, which extends from the Rio Grande south along the coast to about Santa Teresa. The climate, vegetation, rainfall, soils, and drainage are about the same as in the area previously described, but the topography is very different. This zone of coastal flats, dotted with lakes, fronts on the Gulf of Mexico. The inhabitants, therefore, were able not only to collect plant stuffs for food but also to exploit fish and shell foods. These groups would still probably have been fairly small and would have had to move occasionally to new fishing or collecting areas. The meagre ethno-historical data do not show them to have been very different from their neighbors to the west, but archaeology shows that both the historic and prehistoric groups of the Washington Beach zone had fairly large, specialized, material cultural inventories. Furthermore, they underwent some cultural changes and received various tools from other groups. Their position on the coast, on lakes or bays, sheltered by long islands from the open sea, put them along an inland waterway and possible route of movement of peoples from both the southwest and northeast. As Huastec pottery is often found in sites at the mouth of the Rio Grande, evidently the north-south route was often used. In addition, the Rio Grande offered a water route to the northwest.

This area somewhat contrasts with the coastal region to the south, from Santa Teresa to the mouth of the Soto la Marina River, called the Catan zone. Although it is still a region of coastal flats, the flats are narrower, the rainfall is greater, and the vegetation is more prairie-like. Culturally, it has none of the elaboration in shell tools found at sites at the mouth of the Rio Grande and differs little from the late materials in the interior Laredo and San Fernando zones. However, it does show greater contacts with the Huasteca, and some of the sites might have been occupied by the Huastecs themselves.

The region to the west of the Catan zone is called the San Fernando zone. It is a semi-desert bushland on the eroded peneplain and has slightly more rainfall than the regions to the north. Though some seasonal agriculture might possibly have been practiced, hunting and food-gathering formed the primary mode of subsistence. From what little we know of the archaeology of the late periods of this region, the cultural level does not differ radically from the Laredo zone or the coastal Catan zone, and fewer outside contacts are evident in the San Fernando zone.

The Soto la Marina River represents both a cultural and a geographical break in Tamaulipas. The four areas north of the Soto la Marina, just described, are areas poorly fitted for agriculture because of rainfall and general climate; whereas the four areas to be described south of that frontier are well fitted for agriculture and its concomitant cultural advances.

The San José de las Rusias area is in part of the zone of eroded peneplain with good winter rainfall. This area is suitable not only for agriculture but also for animal life in great abundance. Ethnologically, tribes of the Sierra de Tamaulipas occupied the area, and, archaeologically, there are ruins and sites with pottery and evidence of agriculture. It seems to tie in very closely with the Sierra de Tamaulipas zone, but the vegetation in the latter is mixed forest and the topography very different. From cursory survey, the Sierra de Tamaulipas seems to have more ruins.

To the west we have the Sierra Madre zone with mixed forest, higher mountains, and less rainfall. From the standpoint of human habitation it is less agreeable than the region to the east. Archaeologically and ethnologically, indications are that it ties in fairly closely with the Sierra de Tamaulipas region.

Along the Tamesi River and in southern Tamaulipas is an eroded peneplain area of tropical climate and savannah vegetation, and as the southern coast up to the Soto la Marina River has heavy rainfall, I have also included it with this area. This relatively lush zone is called the Tampico zone. Certainly the ecological potentialities would allow for cultural advance and fairly rapid cultural changes. It coincides closely with the northern Huasteca and with the region in which late Huastec archaeological remains are encountered.

THE INDIANS OF TAMAULIPAS

Except for the Huastecs in the southern fringes of the state, all the other aboriginal inhabitants and tribes of Tamaulipas are now extinct. Unlike the more central parts of Mexico, no good descriptions or chronicles concerning the natives or their languages have come to light, and unlike the rest of Mexico, the conquest of Tamaulipas took place late in the eighteenth century, not in the early part of the sixteenth. In the southern part, the Huastecs had a complex culture based on agriculture, with cities, a political hierarchy, and a rich ceremonialism, which contrasted radically with the life of the nomadic food-gathering, semi-starved small bands in north Tamaulipas.

Because of the lack of extant aborigines and the poor documentary sources, the linguistics of Tamaulipas are

[20] Saldivar, 1945.

relatively unknown (fig. 3 A).[21] Only the Huastec language of the Mayan linguistic family has been adequately studied. A few words are known from the Carrizo, Cotoname, and Comecrudo bands, who lived along the Rio Grande and San Fernando Rivers. On the basis of these few words, the languages of these three groups and all other bands of this area have been grouped into the Coahuiltecan family. Such an all-encompassing classification must at best be considered tentative as the evidence is exceedingly flimsy. Another major linguistic family,Tamaulipecan, has been set up on the basis of less than one hundred words from the Maratino band, who lived near the mouth of the Soto la Marina River. Grouped into this family are the languages of all the bands south of the San Fernando River, east of the Sierra Madre, and north of the Huasteca. Furthermore, this Tamaulipecan family is classified as a variant of the Coahuiltecan stock. Such a classification is more encompassing than the former, and the evidence is even poorer. A third family, "Janambre," has been established for southwest Tamaulipas on the basis of a statement by Orozco y Berra to the effect that this group and others spoke a "particular" language. Swanton and others, on the basis of these peoples' proximity to the Coahuiltecan-speaking groups, have placed them within that stock. Weitlander, from a study of words from a descendant of a band near Tula, Tamaulipas, is inclined to link them with the Otomi family and Pames language. In figure 3 A is shown Mason's and Johnson's map of linguistic distributions.[22] Because of an archaeological bias, which I will explain later, I doubt that the map is correct, and I believe that, still taking into account the feeble linguistic and ethnographic evidence available, the distributions could probably be set up in a way that better fits the archaeological data. One thing is certain, however: an intensive study of the early documents concerning the tribes and tribal names of Tamaulipas by a linguist is necessary.

The ethno-history and ethnography of Tamaulipas is on a somewhat firmer foundation because of the studies of Gabriel Saldivar[23] (fig. 3 B), who has examined a large number of early documents about Tamaulipas and extracted considerable pertinent information about the aborigines. I sincerely hope his fine work will be continued by concentration on documents in various churches (some of them formerly missions for the Indians) in Tamaulipas. As, unfortunately, I have not been able to examine the original sources of Saldivar, I am forced to use his material uncritically in the following section.

Saldivar divided the tribes of Tamaulipas into four general groups: the group (*grupo*) of (1) the north, (2) the Sierra Madre, (3) eastern Tamaulipas, and (4) the Huasteca (fig. 3 B). It might be noted that these "culture areas" more or less coincide with the climatic, vegetational, and ecological zones.

The group of the north was by far the most primitive and occupied the largest part of Tamaulipas. According to Saldivar it would have occupied all of Tamaulipas north of the Soto la Marina–Purification River. Some of the bands in this group (at about 1750) were the Masacuajulam, Lugplapiagulam, Perpepug, Clancluiguyguen, Concuguyapem, Perpacug, Cotomanes or Cotonames, Comecrudo, and the Carrizo.

The bands subsisted mainly by fishing, hunting, and food-gathering. Hunting of deer, rabbit, turkey, and pheasant was done with bow and arrow. It has also been reported that they were cannibals. The skins of animals were used for clothing. Meat was either eaten raw or roasted. Fire was made by rubbing two sticks together. Fish were caught with nets, by shooting them with arrows, or by catching them with the hands. They were roasted. In the summer they collected the tender buds of the *nopal*, the flower of the *tuna* and little *tunas*. These were often collected in bags and then dried in the sun on mats. Some were roasted. They also collected nuts, wild fruits, seeds of the ebony, newts, and insects. Peyote was also used, often mixed with ground human bones or with ground maguey. The juice of *tunas* was evidently mashed in clay and grass-lined pits. Water was evidently collected in hollow *nopales* and then transported in bags over the shoulder or by a tump-line. In the winter, food-gathering was more difficult, and often they had to return to the scene of summer food-gathering to collect old pods and *tunas*, which they ground or roasted for eating.

Bands were usually small, two or three families; occasionally the name of a leader is mentioned. Houses, as such, were non-existent. Individuals often had tattooed faces, and some bands seem to have had distinctive markings. Evidently bands gathered occasionally for ritual dances for good hunting, and peyote was taken on such occasions. Burials were often made in "tumbas," and flint knives, scrapers, and arrow points were placed with the bodies. Circumcision was practiced by at least the Lugplapiagulam. Saldivar speculates that, because the groups were often named after foods or animals, these animals may have had totemic significance.

All in all, the description of these people reveals them to have been similar to those of the Great Basin in their simple social organization, starvation diet, and simple technology. Their "friendly and docile nature" allowed them to be easily conquered, and as they did not become easily Christianized their extermination was rapid.

Similar to the northern group are the tribes of the Sierra Madre. These occupied the southwest part of Tamaulipas from the San Luis Potosí border to the Purification River, and from the Nuevo León border to

[21] The linguistic discussion presented here is based on Mason, 1940.

[22] Mason; Johnson, 1940.

[23] Saldivar, 1945.

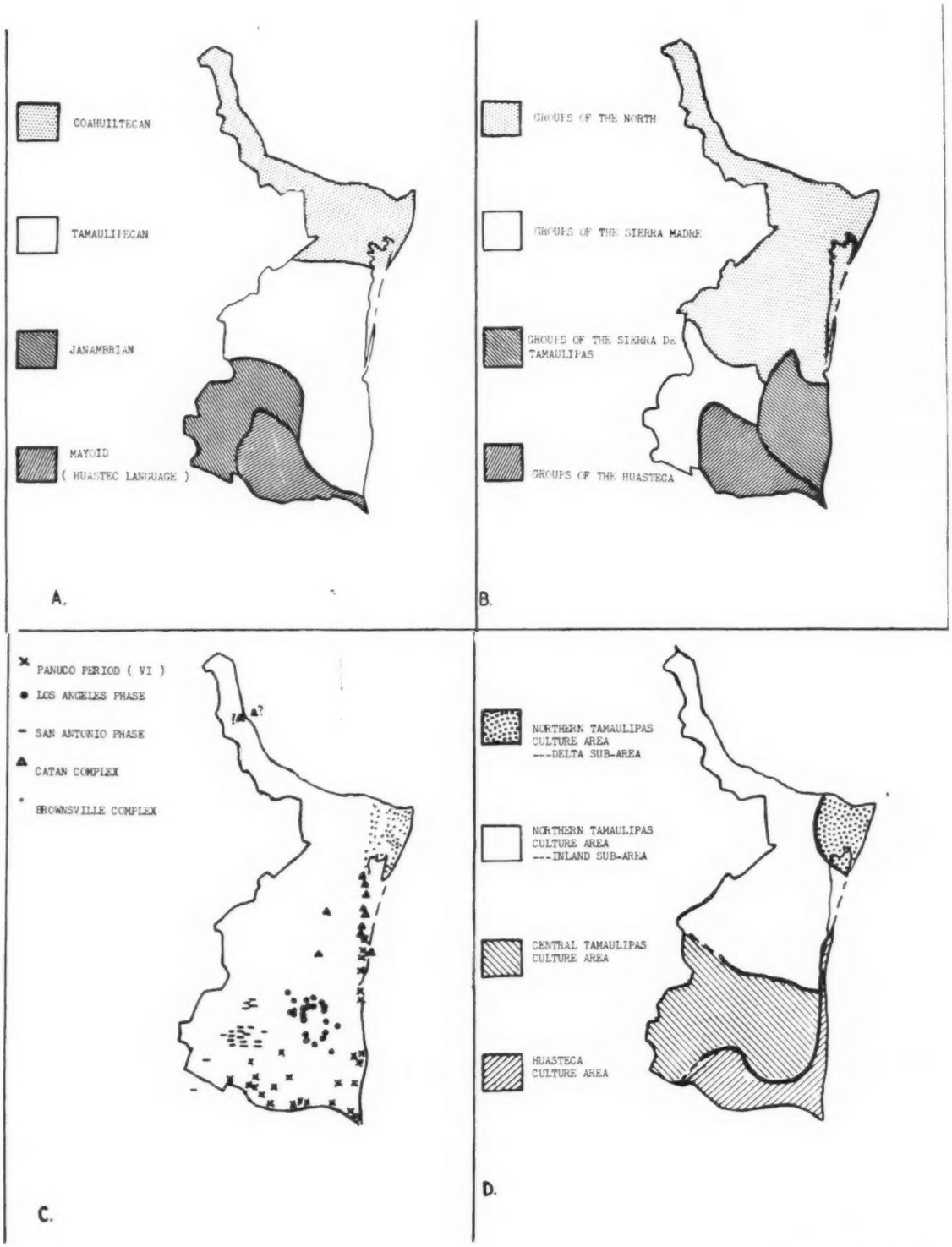


FIG. 3. Indians of Tamaulipas. A. Areas of linguistic families of Tamaulipas. B. Cultural groups of Tamaulipas based on ethno-historical data of 1750 (after Saldivar). C. Historic or late prehistoric archaeological manifestations. D. Tentative culture areas of Tamaulipas at about A.D. 1500 in light of archaeological and ethno-historical information.

the Guayalejo River. This group included the Pames, Janambres, Pisones, Olocnoques, Tancalgues, Shiguillones, and others.

Like the groups to the north, they were hunters and food-gatherers, in the summer eating *nopal*, *tunas*, and *mesquite*; and in the winter, juice of *agaves*, *maguey*, and *lecheguilla* (milkweed). Hunting was done with the bow and arrow.

They evidently lived in caves and occasionally constructed small huts. Their small bands may have combined occasionally into larger bands, under fairly strong leaders, for warfare. According to the Spanish, they were fierce warriors, who wore armor made from skins, and used the lance and bow and arrow. They are recorded also as using smoke signals. They were conquered by the Spanish around 1627 but continued to exist for two more centuries.

Contrasting with these tribes were those of the Sierra de Tamaulipas who occupied the territory east of the Sierra Madre and south of the Soto la Marina River to the Tamesi and Guayalejo. Among the bands of this group are the Pasitas, the Mariguanes, the Simariguanes, Olives, Anacan, Mapucan, and the Yamacan.

These peoples were sendentary agriculturists who planted maize, beans, squash, "sweet potatoes, potatoes," melons, gourds, and *chile*. This diet was supplemented by some food-gathering, fishing, and hunting. Hunting of deer and, in historic times, the horse was done by the bow and arrow, and by chasing the animals into fenced enclosures and then killing them. Fish were caught by poisoning them or by trapping them in cylindrical revolving fish-traps. Plants gathered included the fruit of the palm, *palmitos*, and ebony pods.

Besides bows and arrows, they had knives and axes of flint, the mano and metate, pottery, stone vessels, mats of palm fibres, and baskets made from palm fibres and bark.

Their houses, which were rectangular or round, had wattle-and-daub walls and roofs of thatch or woven palm leaves and surrounded a circular plaza with their doors facing it. Except the chief's house, which was larger, most of them were the same size. On the inside the houses were divided into a series of rooms for living quarters, storage, etc., and around the houses fenced gardens provided the inhabitants with food. Wild foods and animals caught in the hereditary lands of the tribe were common property.

Marriage seems to have been monogamous, and inheritance patrilineal. Some division of labor apparently existed between the sexes, with the men doing the hunting and the women growing the corn. There may have been specialists who made baskets, clothing, pottery, and stone tools. There also were fairly strong chiefs, but no mention is made of priests. We know practically nothing of their religion other than that they had ceremonies to celebrate victory and to obtain rain. Flutes and drums supplied music for the dances, and while they danced they drank a beverage made from peyote.

These groups, which were conquered in the last half of the eighteenth century, were pretty well extinct by the beginning of the nineteenth.

The Huastecs occupied the Tamesi and Guayalejo drainages of Tamaulipas, and Ortelio's map of the sixteenth century notes over twenty-five villages or towns in Tamaulipas. Although documents concerning this group are more numerous and more detailed than they are about the groups farther north, and although both Saldivar and Joaquin Meade have written about the historic Huastecs, a definitive ethno-historical work about the group has not yet been written. Furthermore, as comprehensive studies still have not been undertaken among the living Huastecs, what I shall say about them will be both superficial and brief.

The Huastecs were sedentary agriculturists, who grew corn, beans, squash, "melons," (*sic*), *chili*, cotton, and other plants. Their diet was probably supplemented to a small degree by hunting, fishing, and food-gathering. Habitations were often in small villages, around ceremonial centers, or in cities such as Panuco. There were streets and, evidently, blocks grouped around plazas with temples on truncated pyramids. The pyramids were either of dirt or rock, covered by plaster with wooden or wattle-and-daub structures on their summits. Pyramids were usually circular, though some were rectangular. The round or oval houses had walls of wattle and daub, and roofs of thatch or woven palm leaves.

Villages and towns were evidently grouped together into political units under a king and a series of nobles or a priest-king. Tribute was evidently exacted from the earnings of the peasants. A fairly rigid class system may have existed and probably included a warrior class who helped to enlarge the political units and who kept law and order. Huastec warriors are depicted by the Aztecs as using the bow-and-arrow and the shield.

There is evidence of considerable trade and many market places, as well as individual craft-specialists.

There is a hint that there were exogamous patrilineal clans into which the patriarchical families were grouped.

Their religion was evidently very complex with a pantheon of gods, elaborate rituals including human sacrifice and the collecting of human heads, a hierarchy of priests, temples, and a cult of the dead.

Archaeologically we now have some facts that can supplement and correct this meagre ethnological data (fig. 3C). In the Huasteca there are sites with Period VI or the Panuco Period ceramics in the area described by Saldivar. Furthermore the same type of ceramics occur in sites along the coast to Catan, about fifty miles north of the mouth of the Soto la Marina River. These small sites, often shell mounds, have all the pottery types of Period VI, or the Panuco Period, from the Tampico–Panuco region as well as the same types of

projectile points, manos and metates. In fact, the assemblages contain only those objects found in the Panuco (VI) Period farther south. Because of the complete correspondence of the material culture, I have assumed that both the camp-sites extending along the coast and those in the Panuco–Tampico region were occupied by the Huastecs. A statement by Garay [24] in 1523 about his march from the Rio de las Palmas (probably the Soto la Marina River but possibly the San Fernando River) to Panuco tends to confirm such a distribution. In this account he said he met "people from Chila" (Huastecs) at the first river south of the Rio de las Palmas along the coast. Therefore, I would supplement Saldivar's Huasteca to include a narrow strip along the coast. This would place the Huastecs not only in the savannah area of tropical rainfall but in the meadowed area of heavy rainfall along the south coast. At historic times this northern border of the Huasteca would be the true northern border of Meso-America, as the Huastecs have most of the characteristics that Kirchoff considers diagnostic of the Meso-America culture area.[25]

In Saldivar's area of "the group of the Sierra de Tamaulipas" is to be found the Los Angeles Phase. As will be seen later, this phase evidently represents the material culture of at least the historic Pasitas tribe and probably other tribes. From this present evidence, I would keep this second culture area the same, except for the coastal strip given to the Huastecs. This culture area would closely coincide with the climatic area of warm temperature and summer rains. Geographically, the area has both mountain ranges and eroded peneplain topography as well as mixed forest, prairie, and bush vegetation. It is in the Sierra de Tamaulipas and San José de las Rusias ecological zones. As this area at historic times had some, but not all, of the Meso-American characteristics, it could be considered either a peripheral part of Meso-America or a transitional area outside of it. Ruins of roughly classic times, however, indicate that probably from the time of Christ to A.D. 1000 it was a definite part of Meso-America.

The Los Angeles Phase is extremely closely related to the San Antonio Phase of southwestern Tamaulipas and only bears a superficial resemblance to complexes north of the Soto la Marina River. If there is any sort of relationship between language and culture in this area, I would suspect that the so-called Tamaulipecan language is not related to Coahuiltecan but to Janambre and possibly to Otomi.

The archaeological picture of the people of the Sierra Madre is at considerable variance with that given by the ethno-history. Archaeology has revealed that the people living in late prehistoric times were agriculturists, who lived in small villages, used the bow and arrow, and, in fact, had a material culture very similar to that in the Sierra de Tamaulipas. Certainly the archaeology would include both the Sierra de Tamaulipas and southwest Tamaulipas in the same culture area. Perhaps the culture that Saldivar gives for the area developed in historic times and does not represent that of the area at the time of first Spanish contact.

North of the Soto la Marina River we have two, somewhat related, historic complexes: Catan and Brownsville. The Brownsville Complex is confined to the Washington Beach ecological zone in the delta of the Rio Grande. Its tools reveal a specialized adaptation to coastal life. Ethno-historical data on this way of life are at present lacking. Nevertheless, I would set this area up as a special culture area or a special subdivision of the "group of the north." The material culture represented by the Catan Complex (and probably a number of other complexes still unfound) coincides fairly closely with the descriptions of that of the "group of the north."

In summary, then, we have three major culture areas in Tamaulipas (fig. 3 D). One is the Huasteca with a truly Meso-American culture. The second is the area of the Sierra de Tamaulipas and southwest Tamaulipas with a culture similar to that found in Meso-America. The third area, northern Tamaulipas, has two subdivisions: a food-gathering culture adapted to the interior dry plains (called the Interior Subarea), and another adapted to littoral living (called the Delta Subarea). This third area belongs to the major area called "Aridia America."

EXPLORATION AND CONQUEST OF TAMAULIPAS

The first explorer to sight the coast of Tamaulipas was Alonzo Alvarez de Pineda, in 1518. He was a captain commissioned by Francisco de Garay to map and explore the coast as a preliminary step to Garay's conquest of the area.[26] In this first trip, the Spaniards met (and fought) the Huastecs at Panuco. In the following year Garay and his soldiers returned and established a village called "Amichel," 90 leagues north of Panuco at the mouth of a river called "Rio de las Palmas" (probably the Soto la Marina River).[27] There they mingled with natives, and the village continued to exist until 1523, when a lack of supplies and trouble with the natives forced Garay to abandon the post and make his way to Panuco. It is interesting to note that he met people from Chila (Huastecs) on the next river south of the Soto la Marina River, and it is unfortunate that other descriptions of other peoples have not survived (if they ever did exist).

However, in the meantime Cortés had conquered the Huastecs at Panuco in 1522 and was extending his conquest to the Huasteca of Tamaulipas when Garay arrived. Since Garay had been a rival of Cortés in the

[24] Casteñeda, 1936.
[25] Kirchoff, 1943: 92–107.
[26] Saldivar, 1945.
[27] Candelario Reyes, 1944.

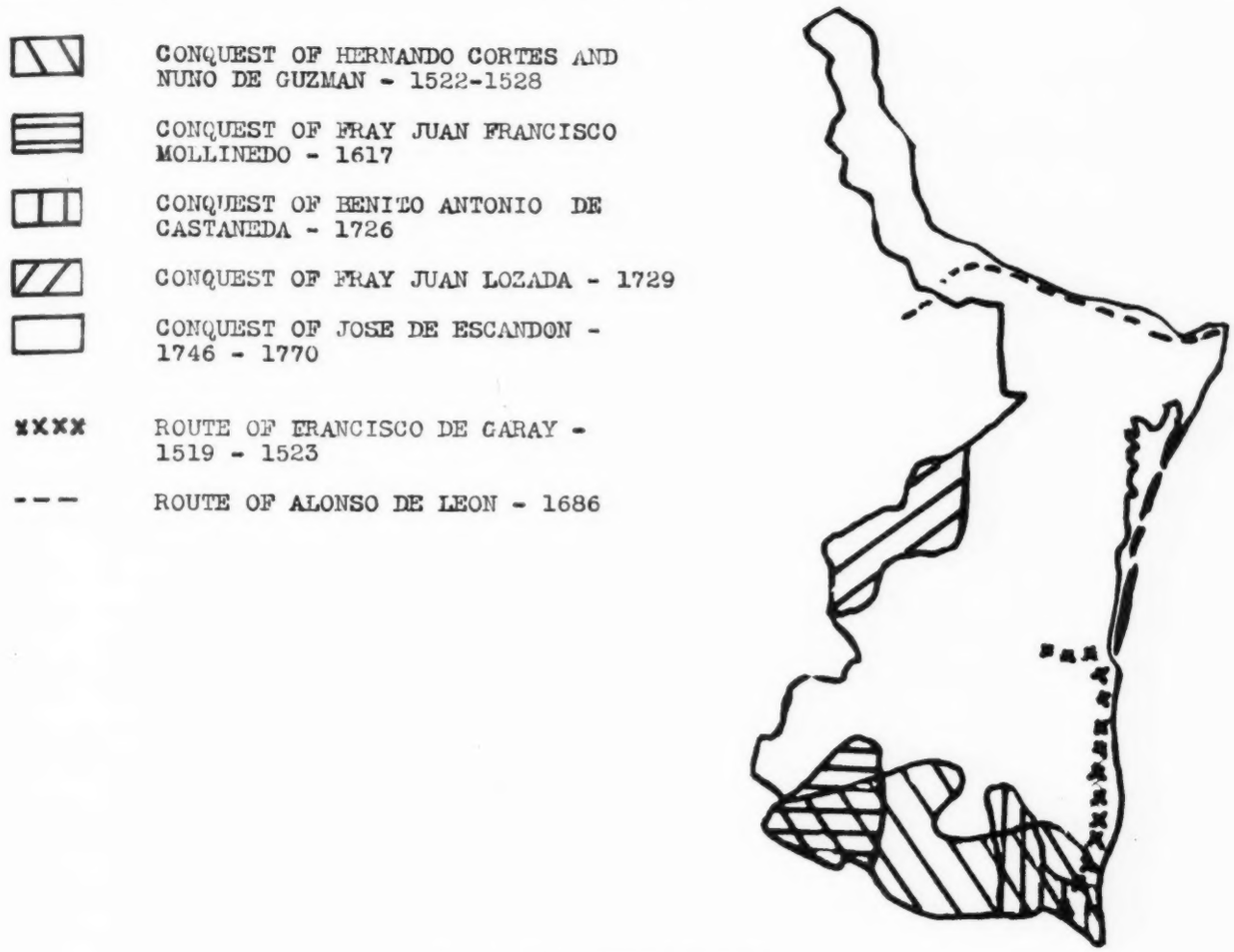

CONQUEST OF HERNANDO CORTES AND NUNO DE GUZMAN - 1522-1528
CONQUEST OF FRAY JUAN FRANCISCO MOLLINEDO - 1617
CONQUEST OF BENITO ANTONIO DE CASTANEDA - 1726
CONQUEST OF FRAY JUAN LOZADA - 1729
CONQUEST OF JOSE DE ESCANDON - 1746 - 1770
ROUTE OF FRANCISCO DE GARAY - 1519 - 1523
ROUTE OF ALONSO DE LEON - 1686

FIG. 4. The conquest of Tamaulipas.

conquest of Mexico, the latter immediately put Garay in chains and his days of exploring were finished. Nuño de Guzmán, under Cortés's orders, carried on the conquest of the Huasteca in Tamaulipas until 1528. Besides subduing and slaughtering the Huastecs, Guzmán made forays into more northerly Tamaulipas in search of gold and slaves. Guzmán's excursion undoubtedly affected native society, and his capturing of slaves no doubt reduced the local tribal population. By the end of the sixteenth century Tamaulipas south of the Soto la Marina was evidently fairly well known, as Ortelio's map of that date shows quite accurately the location of various rivers and mountains. Even more important, he recorded the location of a whole series of Huastec villages.[28]

While the conquering was going on, the Catholic missionaries were at work in southern Tamaulipas. Of the various missionaries, Andres de Olmos was outstanding; he traveled extensively in northern Tamaulipas and even persuaded the Olives, a tribe in central Tamaulipas, to become Christians and return to southern Tamaulipas with him.[29]

Besides the missionaries and conquerors, a number of explorers such as Moscoso in 1543, Luis Carbájal in 1582, De Luna in 1549, and Sir John Hawkins in 1568, traversed or touched on Tamaulipas on their way to other points.[30]

The seventeenth century was a period of relative quiescence for Tamaulipas. Fray Juan Francisco Mollínedo "took possession" of a small part of southwest Tamaulipas (Tula and Jaumave) in 1617. Numerous explorers and missionaries crossed the state, but none stayed very long or left records of the peoples of the country. There is one exception to this—Alonso de León. In 1685–1686 he went from Nuevo León down the Río San Juan and then down the Río Grande to the Gulf of Mexico. In addition to the geographical landmarks of this trip considerable information concerning the native inhabitants was recorded.[31]

[28] Saldivar, 1945: 53-62.

[29] *Ibid.*

[30] Saldivar, 1945.

[31] Reyes, 1944.

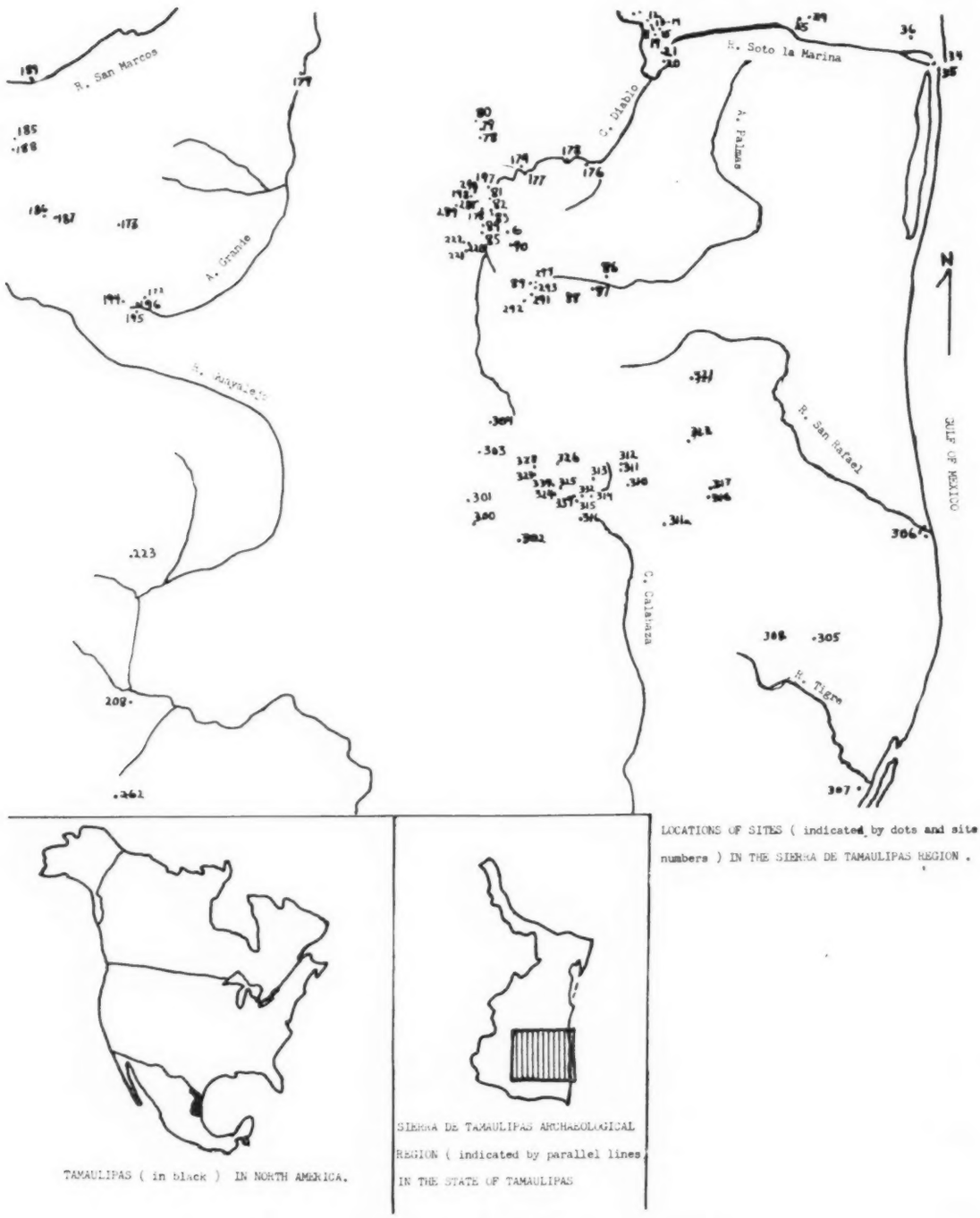

R. San Marcos
R. Soto la Marina
C. Diablo
A. Palmas
A. Granite
R. Purgatorio
R. San Rafael
GULF OF MEXICO
C. Calabaza
R. Tigre
N
LOCATIONS OF SITES (indicated by dots and site numbers) IN THE SIERRA DE TAMAULIPAS REGION .
TAMAULIPAS (in black) IN NORTH AMERICA.
SIERRA DE TAMAULIPAS ARCHAEOLOGICAL REGION (indicated by parallel lines) IN THE STATE OF TAMAULIPAS

FIG. 5. The location of the archaeological zone in the Sierra de Tamaulipas.

The eighteenth century saw the actual conquest of Tamaulipas. In 1726 and 1729 two expeditions conquered small parts of the state.[32] Benito Antonio de Casteñeda conquered north from Tampico to about Aldama in 1726, and Juan Lozada a part of west central Tamaulipas in 1729. However, it was not until the arrival of José de Escandon in 1746 that conquest really got underway. With his soldiers he set up a series of forts, which have now become the main villages of Tamaulipas, such as Llera, San Fernando, Reynosa, Laredo, Jiminez, Villa Casas, Padilla, and Ciudad Victoria.

[32] *Ibid.*

During this time the location of numerous tribes and some of their customs were recorded. However, the record is a short one, for the Tamaulipas tribes resisted conquest and soon disappeared.

Of especial relevance to this report is the establishment about 1770, with Villa de Croix (Villa Casas) as headquarters, of missions to the Indians in the Sierra de Tamaulipas.[33] One of these missions for the Pasitas tribe was at the town of Los Angeles, near a Pasitas village. Evidently these Indians and their relatives from the Canyon Diablo fared not too badly for a ten-year period, but about 1780 the Jaumave (or Janambre), who were actively resisting Spanish conquest, attempted to destroy the missions. Though they did not succeed, they evidently did decimate the Indian allies of the Spanish, including the Pasitas.[34] I might add that both the Jaumave and the other small tribes met a similar fate within the next fifty years.

II. THE EXCAVATIONS

1. DIABLO CAVE (Tm c 81)

The Diablo Cave is located in the Canyon Diablo about three miles north of where the trail from Los Angeles to Eslabones crosses that canyon (fig. 5 C). The cave, located on the west side of the canyon, faces east and is at the base of a 150-foot limestone cliff, the floor of the recess being just above the thickly-vegetated talus slope about forty feet above the gravel-covered canyon bottom (fig. 6 A).

The west side of the canyon is exceedingly steep, and above the talus slope are numerous limestone cliffs. However, east across the canyon from the rock shelter the topography is very different. On that side, the canyon floor gradually gives way to a densely forested area which extends eastward for about one-half mile to less well-defined steep limestone cliffs. Though my excursion into this tangled mass of trees was brief, it appeared to cover three terraces above the canyon floor. These seemed to be connected with the terraces that Evans studied.[1]

The above-mentioned cave is evidently the result of water and wind erosion. At the middle of the shelter, the cliff overhangs the floor about twenty-five feet (fig. 6 B) and extends about sixty feet north and south. The sheltered portion of the floor is roughly diamond-shaped; its northern half was covered by huge boulders fallen from the cliff, while the southern half was relatively level and free of rock (fig. 8 and fig. 6 C).

In addition to the inviting features of defensibility, shelter, a level floor, and good visibility of the canyon, evidently the cave during prehistoric times had a slow seep of water in its southern part emerging from the limestone wall near the floor. Evidence of the seep is an area of dissolved limestone over some of the rocks, which permeated a section of the refuse (Zones B and C) adjacent to the cave wall.

METHOD OF EXCAVATION

I first visited the rock shelter in the spring of 1946 while making a preliminary survey of the northern Sierra de Tamaulipas. At that time Pedro Lerma (guide), Roberto Pavon (assistant) and I sank a test pit to a depth of three feet in the back of the cave, square E5. In the initial excavation, four small triangular points and twelve poorly-fired sherds were found in the top four-inch layer of ashes. In the next two feet, one well-fired sherd, painted red, was found, as well as flint chips, while four large crude ovoid blades were uncovered at a depth of two feet, ten inches in yellow tan silt. These hints of stratigraphy, the fact that the cave's floor was roughly level with the top of the high terrace and that artifacts were present in what I thought was a sand level, possibly waterlaid, seemed to warrant further investigation.

In the winter of 1949 the further investigation became possible. At that time, after numerous photographs of the area had been taken and a one-foot contour map of the cave's interior had been drawn, the level southern part of the cave was staked off into five-foot squares. The line of stakes were roughly oriented to the cardinal points. One stake at the edge of the excavated area, but more or less in the centre of the cave, was designated stake 0-0. Fourteen squares were set out and numbered in the manner described previously (fig. 8).

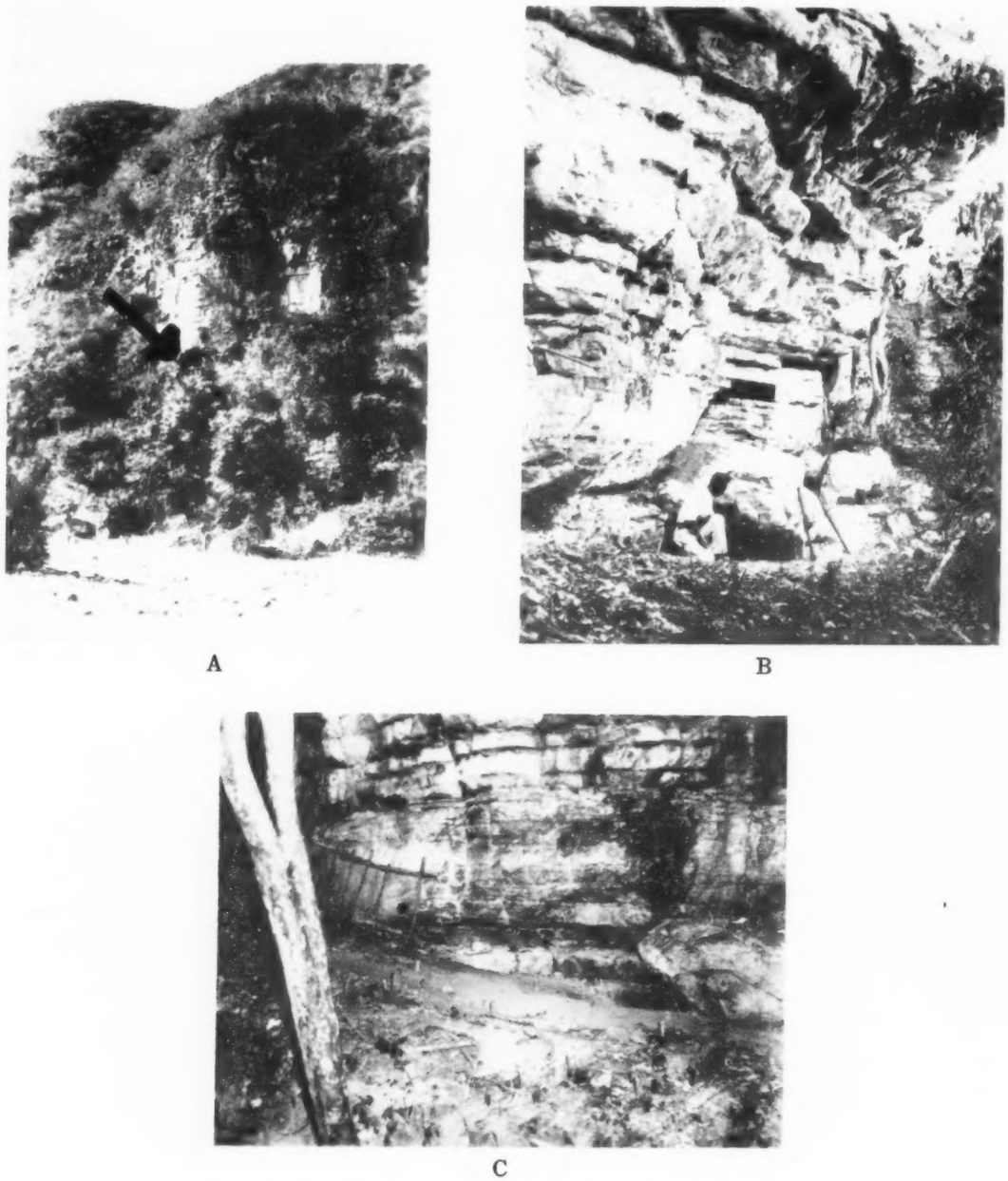
Excavation began in two alternate squares along the edge of the bank, Squares E15 and S10E15. Originally we started excavating these squares by digging with trowels and removing the dirt by shovels, screening it, and placing the materials in cloth sacks in respect to their correct square and level. In removing the first levels, we attempted to obtain a level surface to work on, that is, we started to excavate on the east side of the bank about six inches below the highest elevation at the west end of the square and dug horizontally toward the higher west end. Actually two such levels of two squares were dug in this manner before I decided that such a method was not the best. The following levels, down to where silt began showing in the refuse, were dug in arbitrary six-inch levels and sacked accordingly. When the silt began to show up in the refuse, we stripped off six-inch levels until pure orange soil was reached.

The initial excavation of these two squares represented an experimental digging stage and left much to be desired in terms of excavating technique. Thus the rest of the site was somewhat differently handled. We continued to dig in alternate squares (Squares E15, S10E15, E5, N5E10, S10E5, S15, S15E10), in order that the profiles of every square could be seen, drawn,

[33] *Ibid.*

[34] Personal communication from Sr. José Lerma based on documents in Villa Casas.

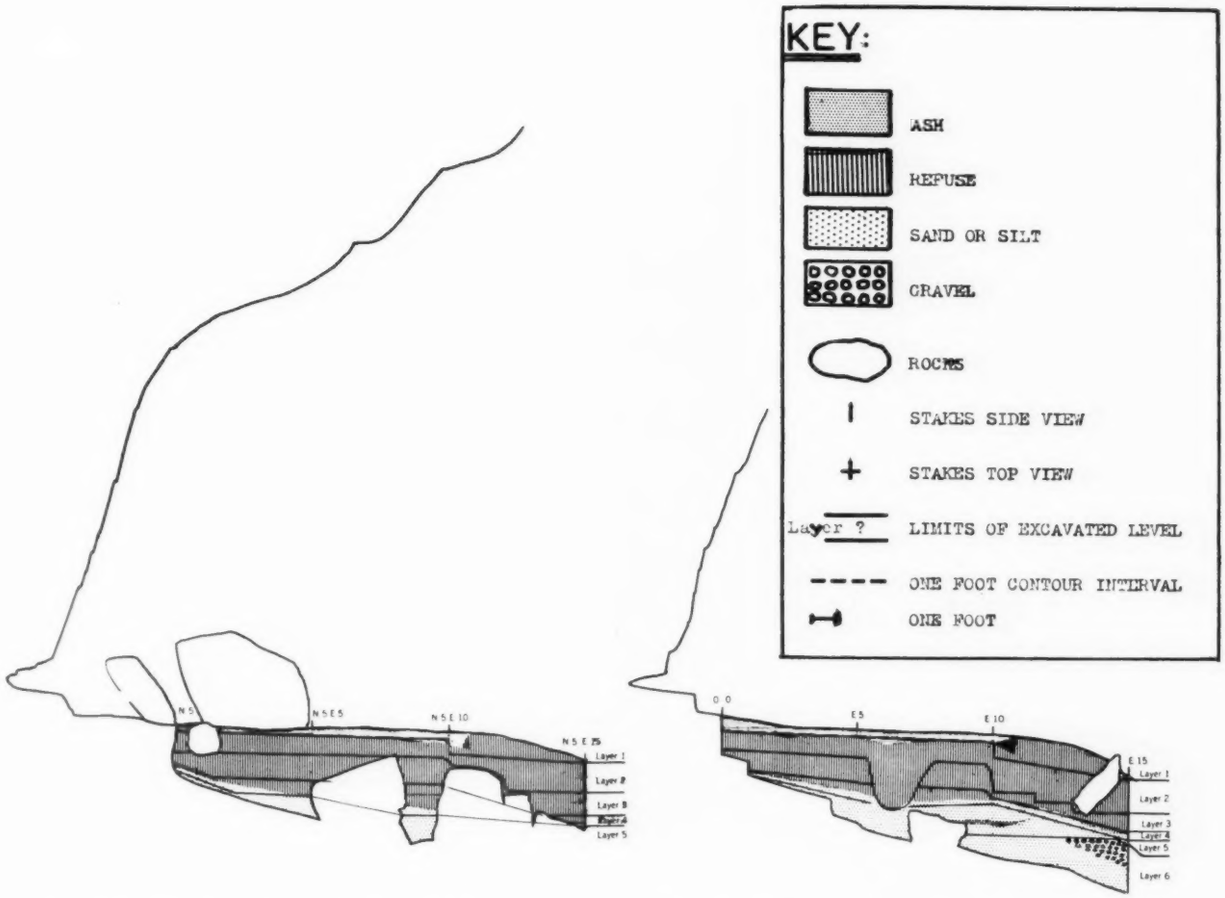
[1] *See* conclusions, p. 194 of this report.



A B C

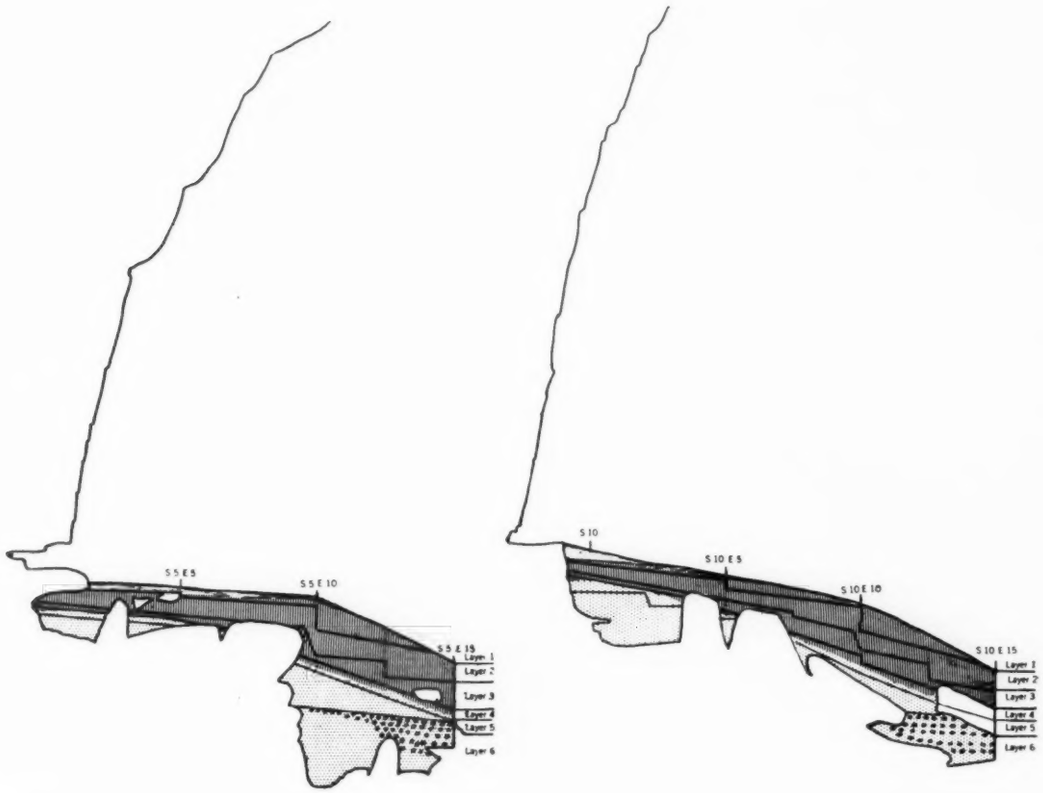
FIG. 6. Diablo Cave. A. Arrow points to Diablo Cave. B. Looking north inside Diablo Cave. C. Area of excavation inside the cave as seen from the east.

and photographed, and so that the in-between squares could be more accurately excavated in terms of their actual strata. Since in the rest of the squares we peeled the actual strata, the top ash level was first taken off as a level. Where the refuse stratum below was over six inches thick, it was divided into arbitrary six-inch levels in terms of half-squares until the silt began to show up in the refuse. Then the junction of the silt and refuse was removed down to a point where only pure silt showed on the floor. Finally, arbitrary six-inch levels were continued in the silt unless features were uncovered. Since the strata and features of these squares could be seen fairly easily, all layers were peeled off by horizontal slicing with a shovel, and all materials were put through a screen. Actual features or junction of strata were still removed by trowel. Photographs were taken of all features as well as of the profiles from S5 to S15 and W5E10 to S10E10.



A. N5 West - east Profile.

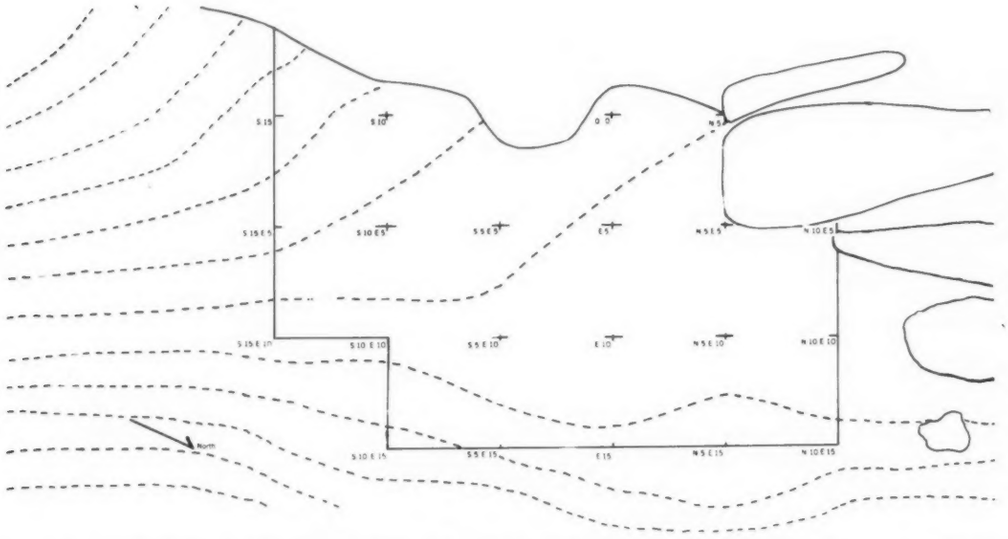
B. 0 West - east Profile.



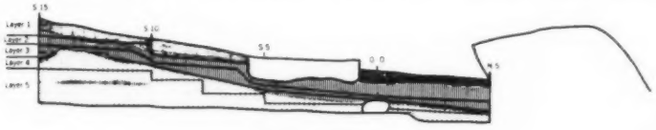
C. S5 West - east Profile.

D. S 10 West - east Profile.

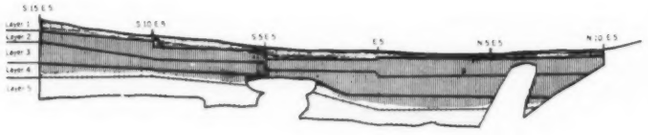
FIG. 7. West-east profiles of Tm c 81.



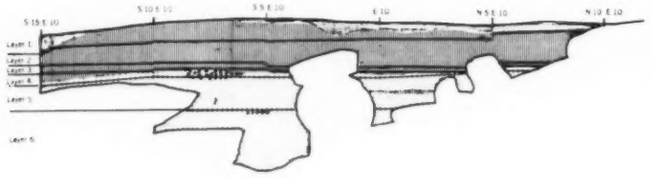
A. One Foot Contour Map of Tm c 81 with Squares and area of excavation.



B. 0 North-south Profile .



C. E5 North -south Profile.



D. E10 North - south Profile.

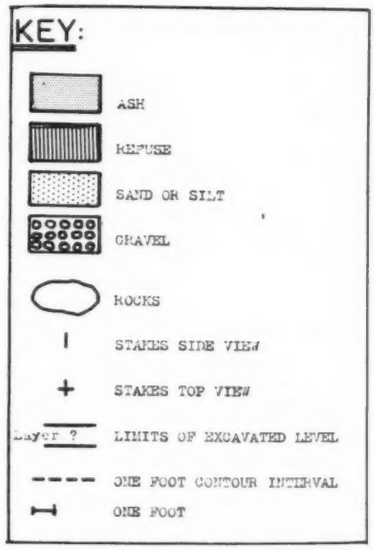


FIG. 8. Contour map and north-south profiles of Tm c 81.

STRATIGRAPHY

The stratigraphy of the cave was relatively simple. From the back of the cave to the edge of the bank extended a fairly well-defined layer of ash called Zone A. This layer, which measured from three to nine inches, gradually decreased in thickness, becoming less well defined toward the edge of the bank and fusing imperceptibly with the darker refuse over the bank's edge. The ash also became less well defined along the southern edge of the excavation (top of fig. 9C and figs. 7 and 8).

Below the ash above the bank was a layer of brown-grey fine-grained refuse extending to the surface of the bank. This was called Zone B (figs. 7 and 9). At the back of the cave in the north part of the excavation this layer was between nine and fourteen inches in thickness. Southward along the edge of the cave wall it thinned out to a thickness of from six to nine inches. However, the layer of refuse gradually thickened eastward away from the cave wall and down the bank, where it reached a maximum depth of three feet in places, though it was usually about two and one-half feet thick. In Square S5E10 a pit extended from the top of the refuse down to the cave floor, while in Square S15E5 a small fire pit extended to six inches below the surface into the lower refuse of Zone B.

Underlying the refuse (except for right at the edge of the excavation down the bank) was a layer of reddish-tan fine-grained silt (terra rosa soil) called Zone C. Above the bank, this tan silt layer extended to the floor of the cave. In Squares S15 and S15E5 between two and one-half and three feet from the surface and between one foot and one and one-half feet below the bottom of the upper layer of refuse, lying as a lens in the fine-grained silt, was a thin (one inch to two inches thick) layer of refuse. Under and over this layer of refuse, called Floor X, lay silt (fig. 9A). The area covered by the refuse and burned rocks of Zone X was roughly oval in shape, being four feet two inches long and two feet three inches wide. Another similar floor (Floor Y) occurred in Square E15 in the silt (fig. 9B). This darkened area was about three feet in diameter.

Over the edge of the bank the situation was somewhat different. In Squares N5E15, E15, S5E15, and S10E15 along the E15 profile, the silt layer (Zone C) under the refuse, when present, was only a few inches thick and overlay a strata composed of gravel and sandy silt, called Zone D (figs. 7 and 9). However, since the top of the gravel was roughly horizontal and the refuse above the silt was at an oblique angle, the deposit of this reddish-tan fine-grained silt became thicker westward toward the E10 profile. Also in numerous places along the E10 profile, since the gravel extended into the cave usually only about three feet, a general silt deposit went down to the cave floor, at one place to a depth of seven feet. Actually, however, I have divided the silt into two zones: Zone C, the silt above the level of the gravels; and Zone D 2, the sandy silt below the gravel. This was done because the gravel appears to be part of the formation of the third terrace, and the D 2 silt on which the terrace gravels lay, as well as the D 2 silt at the same elevation or below it, in front of the terrace gravels, was deposited before the final formation of the gravels and terrace. The gravels and the D 2 silt are very definitely earlier than Zone C, the silt above the terrace and that silt farther inside the cave at an elevation above the terrace gravels.[2] The soil analysis of the silt zones, subsequent to the digging, revealed that grains of waterlaid sand are mixed with the silt of Zone D 2. This gives the final justification for separating Zone D 2 from Zone C, as the latter contains no sand.[3]

Estimates of the age of the silt, sand, and gravel will be presented in the final chapter. Therefore, further discussion of the soil types in the zones, method of formation of the earlier zones, and age of the zones are unnecessary in this section.

THE SEQUENCE OF ARTIFACTS

The first step in the study of the artifacts was the correlation of the levels of each stratum of the fourteen excavated squares. All levels from the gravels, from the silt under the gravels, and from the silt at the same elevation or lower just in front of the gravels (Zones D and D 2) were separated first and called Layer 6. All other levels of silt and the two floors (X and Y) within that silt (Zone C) were designated Layer 5. All levels from the junction of the silt and refuse which contained a little of both (Zones B and C) were considered Layer 4. The lower levels of the refuse (Zone B) without pottery were considered to compose Layer 3,

[2] At this point I should like to clear up certain misconceptions fostered by Alex D. Krieger. In a review of Aveleyra's "Prehistoria de Mexico" in *American Antiquity* **16** (4), in a footnote on page 358, Krieger wrote: "In the rock shelter Tm c 81 where the supposed Diablo Focus was first described, a short trench running down slope from the shelter floor reached the top of a small terrace remnant. A few fragmentary flint artifacts from the foot of this trench were not actually in the terrace and there was no means of dating the latter in geological terms." First, and most important, the first sentence quoted is incorrect as my trench cut *through* the top of small terrace rampart, not "reached the top" of it. This is clearly illustrated in fig. 9C. The first half of Krieger's second sentence is equally misleading for it implies that the Diablo "Focus" artifacts were deposited after the formation of the small (highest) terrace remnant. These artifacts came from Zone D 2, in front of the terrace at the same elevation or below the top of the terrace, and there is no evidence of any intrusion in that area (fig. 9). Therefore, I can see no possible way that these artifacts could have been deposited after the final formation of the terrace remnant. Furthermore, de Witt in his analysis at Zone D 2 (the silts in front or below the top of the terrace) and of Zone D 1, the actual gravels, found minute angular flint particles (and I believe Evans also found some) that are certainly not river-made or caused by the agents of formation of the terra rosa soil but, in all probability, are man's handwork.

[3] *See* de Witt report on soils on page 196 of this report.

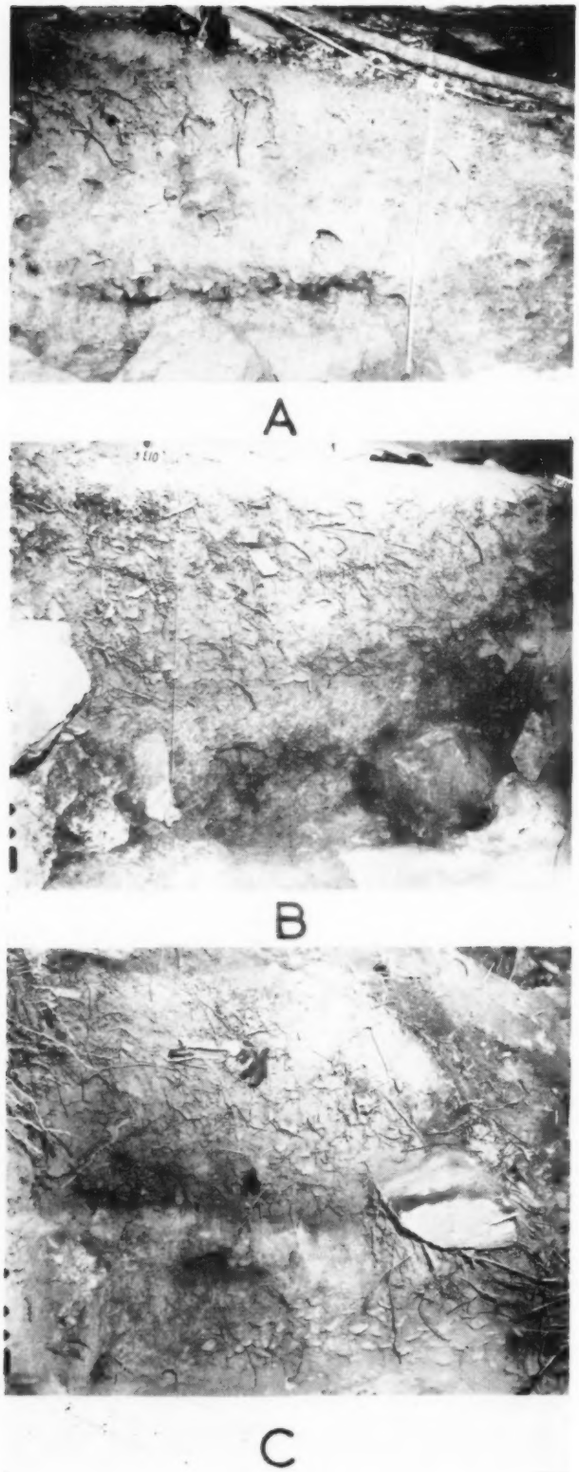


FIG. 9. Pictures of cross-sections in Diablo Cave (Tm c 81). A. Profile from S10 to S15 showing Zone B (refuse) over Zone C (terra rosa soil) which includes Floor X. Note fire-cracked stones in Floor X. B. Profile from E10 to N5E10 showing Zone A (ash) over Zone B (refuse) over Zone C (terra rosa soil) over Floor Y over Zone D 2 (silt). C. Profile from S5E10 to S5E15 showing Zone A (ash) over Zone B (refuse) over Zone C (terra rosa soil) over Zone D 1 (gravel) over D 2 (silt).

while the upper pottery-bearing layer of refuse (Zone B), except for the top level and the stratum of ash, was titled Layer 2. Layer 1 was either the ash layer or, where the ash stratum was not present, the top (six-inch) level.

The cultural components of Tm c 81 and their characteristic artifacts are as follows: The earliest component, named the Diablo Complex, occurred in Layer 6 in the gravels, or in the sandy silt under or in front of the gravels. The artifact complex includes crude ovoid knives, large pebble scraper, large crude flake scrapers, and choppers made from flint cores. The materials of the next component, called the Layer 5 component of Tm c 81 (which belongs to the Lerma Phase), lay in the upper silt and in the refuse lenses within the silt. Distinctive of this complex are Lerma Double Point and Tamaulipas Triangular projectile point types;[4] snub-nosed, large plano-convex, and stemmed end-scrapers;[5] large crudely chipped square-based and semilunar blades;[6] hammer-stones, and gravers.[7] Crude ovoid blades, choppers, and large crude flake side-scrapers like those found in the previous component occur. Layer 4, which partakes of parts of Zones B and C, represents a mixed deposit of Lerma and Nogales artifacts. The third component, designated the Layer 3 component of Tm c 81 (which belongs to the Nogales Phase) occurred in the lower levels of the refuse stratum. Abasolo Round-base,[8] Nogales Triangular[9] and Tortugas Triangular projectile points,[10] disk scrapers,[11] Clear Fork gouges,[12] small chipped disks,[13] pebble manos, and boulder metates[14] are typical artifacts. Ovoid knives, plano-convex end-scrapers, flake scrapers, hammerstones, and choppers appear to be carry-overs from the previous component. Layer 2, the upper levels of the refuse, contains artifacts of the Eslabones Phase. Diagnostic features are the five pottery types of Pueblito ware, Palmillas Corner-notched,[15] Ensor Side-notched,[16] Morhiss Stemmed[17] and Teotihuacan Side-notched projectile points,[18] pointed and rectangular prismatic flake knives, roller manos, angled back metates,[19] and mould-made clay figurines. Abasolo Round base, Nogales Triangular, Tortugas Triangular and Lerma Double-pointed projectile points, a Clear Fork gouge, disk scrapers, large flake bifaces, chipped disks, choppers, hammerstones, and pebble manos occur in this horizon as well as in previous

[4] *See* pp. 62 and 71.
[5] *See* p. 78.
[6] *See* p. 86.
[7] *See* p. 86.
[8] *See* p. 62.
[9] *See* p. 64.
[10] *See* pp. 64–65.
[11] *See* p. 79.
[12] *See* p. 79.
[13] *See* p. 86.
[14] *See* p. 91.
[15] *See* p. 67.
[16] *See* pp. 67–68.
[17] *See* p. 68.
[18] *See* pp. 73–74.
[19] *See* p. 92.

horizons. The final occupation of Tm c 81, represented in Layer 1, is considered to be a component of the Los Angeles Phase. Diagnostic of this component are the pottery types belonging to Los Angeles ware and small finely-made projectile points of the following types: Starr Concave,[20] Fresnos Triangular,[21] Matamoros Triangular,[22] Diablo Corner-notched,[23] Catan Round-base,[24] and Los Angeles Concave and Pasitas Side-notched.[25] Other diagnostics are as follows: flake end-scrapers, pointed prismatic flake knives, thin well-chipped ovoid and triangular knives, a plain pottery spindle whorl, rectangular manos, and rectangular shallow metates. Many varieties of artifacts present in the earlier horizons occur here also, though the number of each variety is small. These artifacts included a few sherds of Pueblito ware, Ensor Side-notched points, Tortugas Triangular points, Nogales Triangular points, Abasolo Round-base points, ovoid biface blades, flake scrapers, large plano-convex scrapers, Clear Fork gouges, roller manos, angled back metates, hammerstones, and roller manos.

SUMMARY

In cave Tm c 81, the first occupation by peoples making artifacts of the Diablo Complex occurred during the final stage of formation of the high terrace at the mouth of the cave. Somewhat later, after terra rosa soil had accumulated on top of the gravels and on the interior floor of the cave, peoples having artifact characteristics of the Lerma Phase occasionally occupied the cave for brief periods. In the meantime more silt accumulated. At the end of the silt accumulation period, the cave was inhabited by groups having an artifact complex known as the Nogales Phase. This occupation was evidently of a more permanent nature, since between six inches to two feet of occupational debris piled up on the cave floor over the terra rosa soils. These people were superseded by the pottery-making Eslabones group, who also left a considerable layer of refuse. The final occupation of the cave (excepting that by archaeologists in 1946 and 1949) was by a people having an artifact complex called the Los Angeles Phase. This group lived near the back of the cave and spread artifacts and an ash layer over the top levels of refuse.

2. LA PERRA CAVE (Tm c 174)

Under the guidance of Pedro Lerma this rock shelter was discovered in 1949 in the course of a brief survey down the Canyon Diablo. It is about eight miles north of Diablo Cave (Tm c 81) and about one-quarter mile north of where La Perra Canyon enters Diablo Canyon. La Perra Cave is on the steep west side of the valley (fig. 10 B) and over one hundred fifty feet above the arroyo bed in the middle of a vine- and scrub-covered one hundred-foot cliff, about sixty feet above it base. At the foot of the cliff is a talus slope covered with dense vegetation (fig. 10 A). As is perhaps obvious, the cave is not readily accessible. It was approached by ascending a stream channel four hundred feet north of the cave, until the top ledge of a lower cliff is reached and thence proceeding (preferably on hands and knees) southward along this ledge to the cave. One may, however, reach it with greater facility from the plateau above the higher cliff (but unfortunately we never tried this approach until our work was completed).

The cave is about twenty-three feet deep, forty feet wide at the mouth, forty-eight feet wide fifteen feet back from the mouth, and reaches a maximum height of about fifteen feet (fig. 10 C). The floor of the cave slopes gently downward from the back wall until about eight feet from the mouth, where it dips very sharply. A few large rocks were on the floor of the cave.

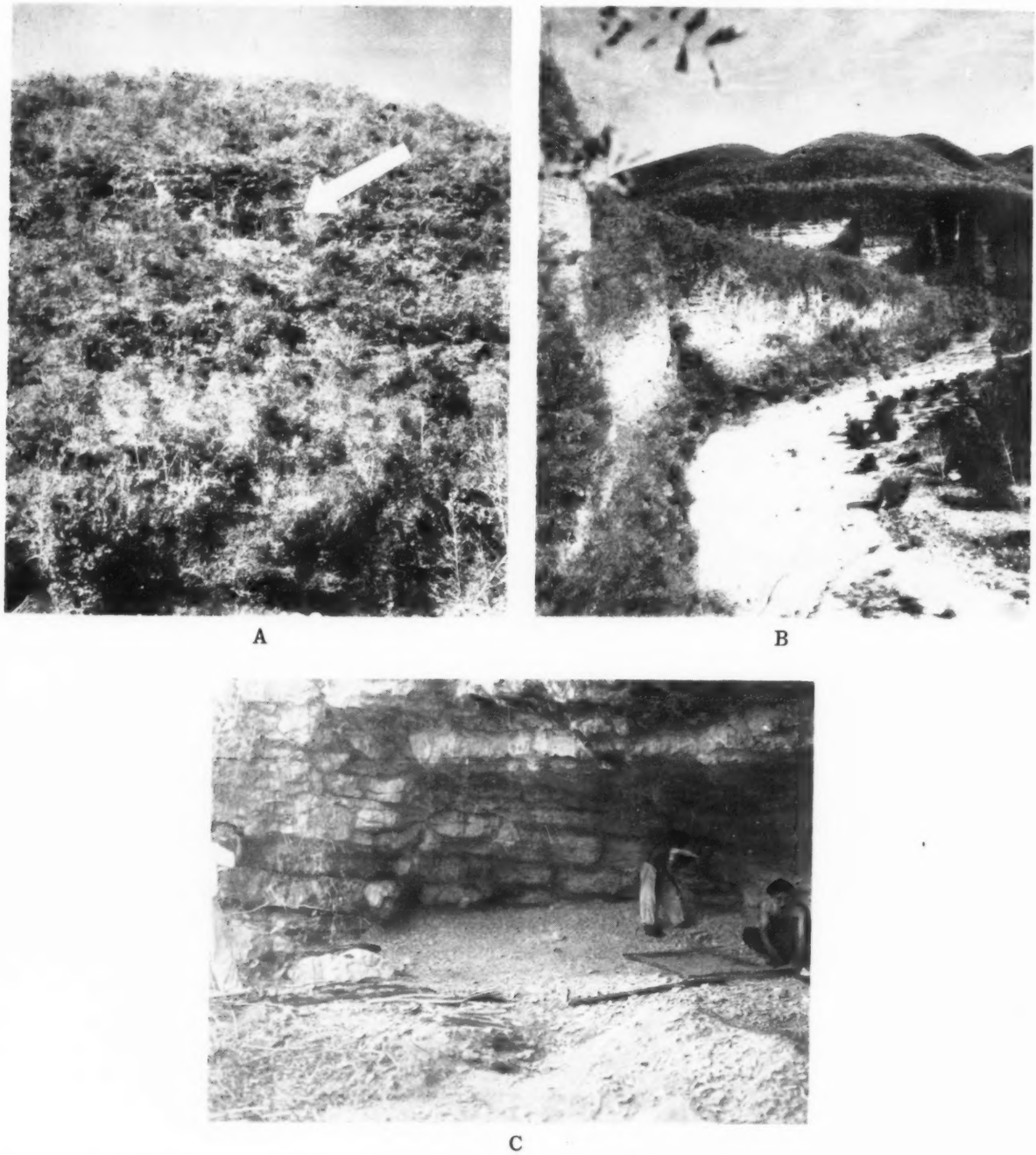
No water is at present available for a distance of fifteen miles from the cave, but during prehistoric times water may have seeped from the lower cliff wall, or it may have been in the arroyo four hundred feet north of the cave, or in the Canyon Diablo. During a more humid period the plateau above the cave or the low wide terrace eastward across the Diablo Canyon bed may perhaps have been amenable to agriculture (fig. 10 B). However, such a period must have been considerably before 1780, the time of the first Spanish records.

METHOD OF EXCAVATION

During the initial visit to Tm c 174, one-half of Square N15 was excavated. Artifacts were relatively scarce, but five distinct strata could be seen, two of which were sealed cultural strata. The lowest cultural strata also yielded one whole Lerma Double-pointed projectile point. Therefore, further excavations were undertaken the week before I planned to leave the Sierra de Tamaulipas.

These second excavations were conducted with a crew of three experienced workers. After the whole cave had been staked out, a series of photographs taken, and a crude map made by means of a steel tape and Brunton compass, three five-foot squares (N5, N15, and N15W5) were dug. Squares and stakes were numbered in the manner previously described, but the excavations yielded few artifacts. Just before Square N15W5 was completed, I left to close up work at Tm c 82. But before doing so, I instructed my supervisor to continue working with a trowel, to be careful to preserve any vegetal material (as some might be parts of cloth or basketry), to draw the profiles when the square was completed, to fill in the holes, and to bring all equipment and specimens to the base camp, in the town of Los Angeles, for shipment. However, the supervisor, Alberto Aguilar, arrived at the base

[20] *See* p. 70.
[21] *See* p. 69.
[22] *See* p. 68.
[23] *See* p. 70.
[24] *See* p. 68.
[25] *See* p. 70.



A B C

FIG. 10. La Perra Cave. A. Looking up from the canyon floor at the cave near top centre of the picture (see white arrow). B. Looking northward down the Canyon Diablo from Tm c 174. C. South end of La Perra Cave before excavation.

camp with three corncobs wrapped in fibre string and a part of a petate. Aguilar also informed me that he had left other vegetal artifacts *in situ*. Needless to say, all my plans changed, and we returned to La Perra Cave with a crew of eight men for three weeks' digging.

Before commencing the final excavation, a map of the cave was made by plane table and alidade (fig. 12). The excavation began in alternate squares. Near the mouth of the cave (Square E5) the strata of earth were removed by shovel and then screened, but in the inner squares all work was done by trowel. The general practice was to attempt to peel off the archaeological strata. If, however, the bottom of an archaeological stratum was not reached before a depth of six inches,

then an arbitrary six-inch layer was dug in the stratum. The next level was taken down to the bottom of stratum or, if the bottom did not appear, to a depth of six inches. Photographs of many of the artifacts and features were taken *in situ*, and the entire cross-section from W5 and N15W5 was photographed.

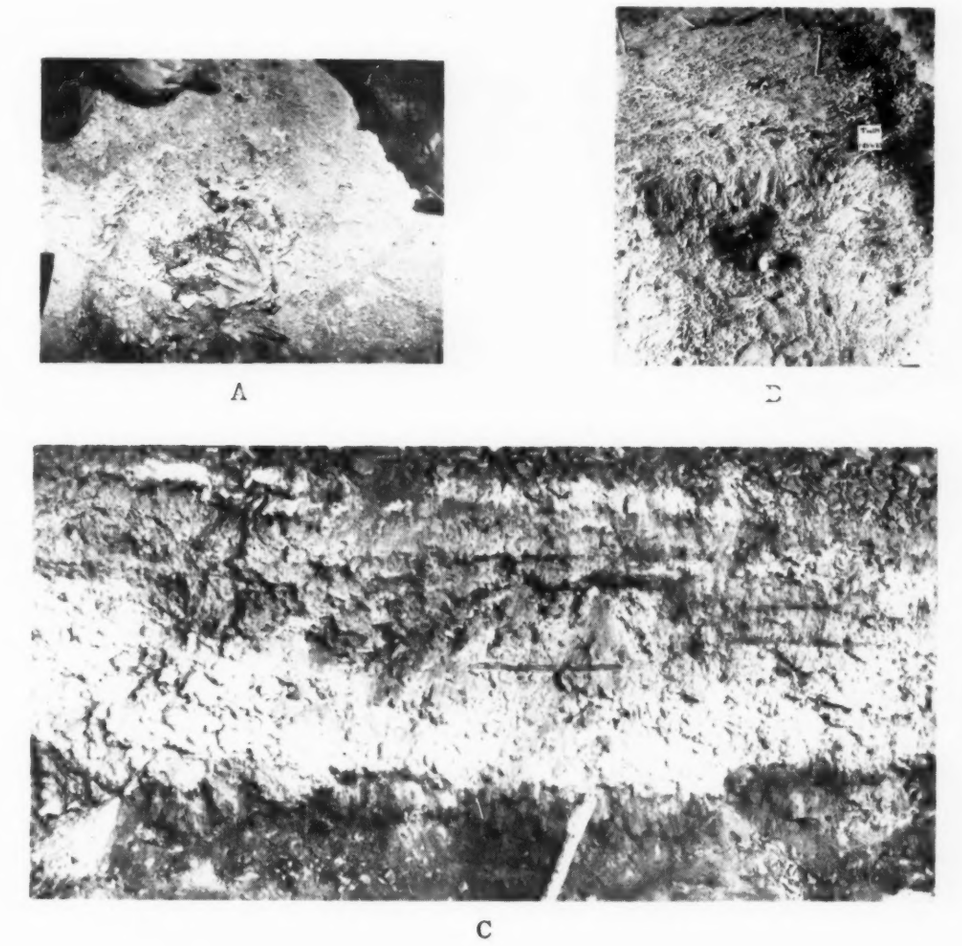


FIG. 11. Excavations in La Perra Cave. A. Woven maguey fibre knotless net under leg of burial in Zone B, Layer 2. B. Burial pit with skull showing in Zone B of Tm c 174. C. Profile from N10W5 to N20W5 showing the whitish ash of Zone A at top of picture, lensed charcoal and vegetal layer, Zone B, the tan sterile Zone C and at the bottom the dark Zone D. D. Bed of leaves before excavation in Layer 1. E. Top leaves removed from bed revealing a twilled mat.

STRATIGRAPHY

The stratigraphy was not complex; it consisted of five zones (fig. 11 C). The top layer, Zone A, was composed of loose rock-fill and underlain by a thin ash charcoal stratum and churned-up vegetal material. This stratum was from four to seven inches thick in the northern and eastern parts of the cave and increased to a maximum depth of fourteen inches in the southwestern part where considerable rolling of refuse was evident. This stratum is called Layer 1.

Underlying Zone A was a stratum composed of grey refuse and lenses of ash and vegetal material, separated from one another by lenses of tan silt. This was Zone B (fig. 11 C). This stratum was thinnest in the northwestern part of the cave and gradually thickened to the south and east. In actual fact, usually two or three levels were taken from the zone, but as the exact number varied from square to square, all the levels have been lumped for analysis, into Layer 2. One flexed mummified child burial was in a pit dug down from Layer 2 (fig. 11 B). Undoubtedly the digging of this burial pit brought early materials into later layers. Where the stratum dipped down sharply or faded imperceptibly into the yellow silt below, it was usually removed by trowel; and the materials were called Layer 3. This layer comprised the lowest parts of Zone B and the upper parts of Zone C.

Underlying the refuse of Zone B was a stratum called Zone C, which was composed of small flakes of rock and fine cream-colored silty sand, formed by the weathering of the rock under dry climatic conditions.

This stratum was thickest in the northern part of the cave and gradually thinned in the southern part. However, to the east and west of the main axis it diminished more rapidly and actually disappeared along the edge of the excavations. Layer 4, almost devoid of artifacts, came from the upper part of this stratum. Layer 5 represents the lower parts of this stratum and uppermost parts of Zone D.

Zone D was a dark grey to almost black stratum underlying Zone C. This zone had lenses of rock-fill alternating with a series of thin black refuse strata. It is a cultural stratum sealed off from other cultural strata by the sterile Zone C (except along the southeasternmost edge of the excavation.). Layer 6 represents artifacts taken from the various levels excavated in the sealed-in Zone D, which was about one foot thick in the northern and eastern parts of the cave and thinned slightly to the south. To the west it completely disappeared at the rock wall or step near the W5 axis.

SEQUENCE OF CULTURAL COMPLEXES

The materials of Zone D and the lower part of Zone C, i.e., those of Layers 5 and 6, appear to be two (or more) archaeological components of the Lerma Phase. The materials found are almost identical with those

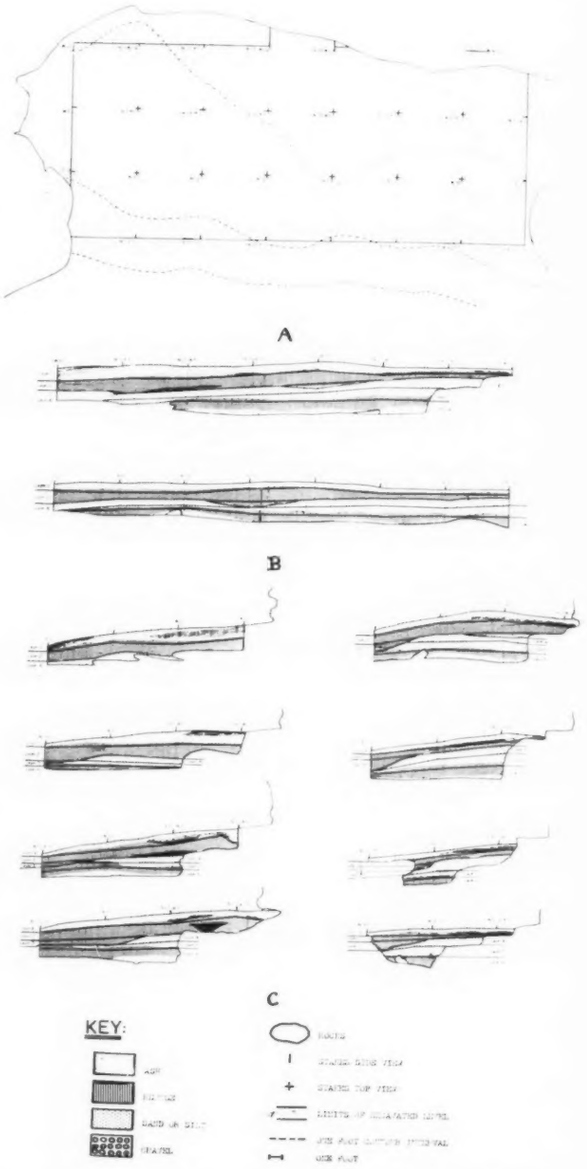


FIG. 12. La Perra Cave. A. Contour map of La Perra Cave. B. South-north profiles of wall of trenches. C. East-west profiles of walls of trenches.

uncovered in Tm c 81 and are definitely the earliest occupation of La Perra Cave. Since these materials have no intrusions from above, being separated by a sterile layer from the later cultural deposits, and since they do not overlay any earlier culture, these components are relatively pure examples of the Lerma Phase. As few cultural differences exist between them, they probably represent the remains of an occupation or occupations by one cultural group.

Projectile points made by percussion flaking are usually crudely chipped, thick, and double-pointed in these

layers. Such points are considered to belong to the Lerma Double-pointed type.[26] Scraping tools are predominantly of four general types: snub-nosed end-scrapers, large plano-convex end-scrapers, large crude flake side-scrapers, and stemmed or hafted end-scrapers.[27] Square-based large knives seem to be particularly diagnostic of this culture, though ovoid and semilunar ones occur.[28] Gravers, retouched cores, and large choppers made from flakes of large river pebbles are other distinctive traits.[29] With the possible exception of chipping along the edges of some points and scrapers (which may have been formed in the course of using the tools), there is mainly percussion flaking. As has been stated previously, the artifact complex found in Layers 5 and 6 of Tm c 174 is almost identical with that found in the sands of Tm c 81.

Layers 2 and 3 from Zone B are considered to be a component of the La Perra Phase. This horizon contrasts markedly with the earlier one in that subsistence seems to have been based upon agriculture and food-gathering with very little dependence on hunting. Evidence of this kind of subsistence are the corncobs, seeds and nuts, crude manos and mullers, and the relatively few bones compared to the great amounts of vegetable materials. Projectile points are still numerous and are predominantly large and triangular (Tortugas Triangular and Nogales Triangular types), though some round-based points occur (Abasolo Round-base).[30] The shafts of two atlatls indicate the probable type of weapon to which the projectile points were attached. Scrapers are common and are generally small, being flake side-scrapers, disk scrapers, or Clear Fork gouge-like implements.[31] Other implements, possibly employed in smoothing skins, are large river pebbles which have been split and the split side then chipped smooth and retouched along its outer edges so that it does not have a sharp cutting edge.[32] I have seen similar implements used by Athabascans on the Yukon and Northwest Territories of Canada for smoothing or grinding hides after they have been scraped clean. Other implements possibly used in preparing skins are large or small chipped disks, ovoid knife blades, and battered pebbles. Numerous pieces of cord and woven nets also occur (fig. 33). A piece of coiled basketry and a single piece of crudely-woven petate were discovered. Other implements include a bone awl and sticks whittled to a point (which, as my workers noted, resembled pencils) and an antler flaker.

The flexed child burial of this component was wrapped in a net and accompanied by two projectile points and three cobs of corn wrapped in string. Beds of leaves were also present.

The final occupation of the cave seems to have been in Zone A. However, the exact separation of Zone A from Zone B in many cases was difficult to discern. As a result, in my preliminary analysis part of Zone A was included in Zone B. However, a more careful checking of the profiles drawn in the field and the photographs of the profiles indicated this error and the error was corrected. However, Layer 1 now includes not only all of Zone A but the small uppermost part of Zone B, for the final inhabitants at Tm c 174 scuffed up and rolled the earlier refuse in with their own, obliterating any clear division between the strata. Therefore, certainly part of the materials similar to those from Zone B, but included in Layer A, did come from Zone B. Some of these artifacts may be cultural carry-overs, though I believe they are very few.

Definitely belonging to the last occupation and not found in Zone B are the eleven Laguna sherds, the fragments of finely-chipped projectile points, the obsidian chips, the rectangular flake knives, the roller mano, and the fragment of a figurine head of the Panuco Bulging-Eye type. Probably belonging to this Zone A and the final occupation are the two pieces of woven cotton cloth, the two finely-made petates in a bed of leaves (fig. 11 D-E), the bracelet-like circle woven from vine fibres, the modern types of corn cobs, masticated maguey (for mescal?), a piece of deer hide, and some pieces of string. Most of the other objects probably were originally used by the occupants of Zone B.

On the actual surface was one bed of charcoal and two Los Angeles sherds representing a brief visit by peoples of the Los Angeles Phase.

SUMMARY

The first occupants of La Perra Cave seem to have been people with the Lerma type of material culture, who appear to have occupied the cave intermittently over a long time period. After this primary occupation the cave was uninhabited for a considerable length of time. Then the La Perra peoples lived on the yellow sand that now covered the Lerma occupation. These groups practiced agriculture and did considerable food-gathering with very little dependence upon hunting. Occupation was probably fairly permanent or at least semi-sedentary. These peoples—they were adept weavers—left the richest material culture of any of the preceramic groups in the Sierra de Tamaulipas. After they left, the cave was unoccupied for a short period, and then a group having the Laguna type of culture moved in. Unfortunately, their occupational debris was mixed with the top part of the earlier occupation. Their stay was seemingly relatively short and might well represent an occupation or occupations of peoples during the corn-cultivating season or hide-out periods in warfare. At best, their occupation was brief and inter-

[26] *See* p. 62.
[27] *See* p. 78.
[28] *See* p. 86.
[29] *See* pp. 85–86.
[30] *See* p. 64.
[31] *See* p. 79.
[32] *See* p. 79.

mittent, and their permanent homes were probably at one of the numerous large ruins on the hills around the Canyon Diablo. Finally, a few sherds of Los Angeles ware and charcoal were deposited on the surface of the cave by passers-by belonging to the Los Angeles Phase.

3. NOGALES CAVE (Tm c 82)

Nogales Cave is situated about one-quarter mile south of where the Los Angeles-Eslabones trail leaves the Canyon Diablo for Eslabones and is about five miles south of Tm c 81. This shelter, in a cliff running north and south, faces east. In front of it is the wide flat top of the third or high terrace which separates the cave from the canyon bed (fig. 13 B-14). This sixty-foot terrace is flanked on the east side by two narrow lower terraces, about ten and twenty feet in height. The floor of the shelter, which is about forty feet above the grass plain (the top of the high terrace) is connected with the plain by a steep talus slope covered by fairly thick vegetation.

The recess itself is large and rather impressive. The cliff overhangs an area roughly one hundred forty feet long and forty feet wide. On the flat floor of the cave, which is roughly semi-lunar in shape and has a maximum width of about thirty feet (fig. 13 A), are a few large boulders. Until about twenty-five years ago there was a slow-flowing spring in the north end of the cave, and as it was a halfway point between Los Angeles and Eslabones, it was a favorite camping spot for local travelers.

On the wall of the cave, particularly in the south end, is a series of pictographs. These pictographs are of three general styles. The first is characterized by thick lines, consisting of hands and circles. The hands are usually painted red and are rather accurate portrayals, except that occasionally the fingers are abnormally thick. The circular pictographs are in the same general style. They are usually a series of concentric circles or spirals made of thick (three-quarters to one and one-half inches) lines in either red or black. The second style is called "counters" or "tally marks." This style has a number of variants, the most common of which is a series of parallel lines, each line being from three to six inches wide and from one-quarter to one-half inch thick. Occasionally the lines have added embellishments, such as cross-pieces at right angles to the lines or bulbous masses about one inch in diameter at either end of the lines. Rarely there are lines composed of series of aligned dashes about one inch long. One example of a rectangle and a single example of a rectangle with a cross in its interior were found. This style is usually painted in black.

The final style is what I call "stick figures." Human figures have a single line for each leg and arm and a single vertical line for the body. Heads are usually represented by a circle or dot above the bodies. All figures are upright, and it was my impression they were in side view. Occasionally there are markings above the head that might represent some sort of a headdress, and lines near the arm extremities that might be tools or weapons. These figures are usually in black and are few in number. Connected with these figures is a series of animals. Four short straight lines attached to the bottom of the curved arc of a semi-lunar body, with a triangle or circle representing the head at one tip of the lunar points, are relatively common. The interior of the semi-lunar design may bear cross-hatching painted in white or it may be plain. These may represent deer, coyotes, foxes, horses, or cows. Occasionally there are outlines of turtles as viewed from above and wavy lines with triangles or spikes on one side (snakes?). Outlines of these figures are always in black or red, and occasionally both appear together, along with white. As most of the figures are covered with a thin transparent film of dissolved limestone, they are a little indistinct. However, this factor precludes any possible confusion of the earlier pictographs with those made by recent Mexican travelers, such as names, dates, initials, and occasionally animal figures (including one elephant), all of which are not covered by a limey film.

Exact correlation of the pictographs with cultural components that had occupied the cave is very difficult if not impossible. However, from other data it would appear that the stick figures may be connected with the Los Angeles Phase, a component of which may be found in the top level or levels of Tm c 82.

METHOD OF EXCAVATION AND ANALYSIS

During the survey of 1946 I stayed overnight in the Nogales Cave, and as this was one of the largest and most impressive shelters in the northern Sierra de Tamaulipas, I marked it for excavation at some future date. Preliminary to excavation, which began in February of 1949 after the work of Tm c 81 had been completed, photographs and a one-foot contour map were made of the site and the plain in front of it. Then, well down the bank and into the back of the cave at the place of maximum cave width and where the cave floor was free of large rocks, a five-foot-wide east-west trench was set up.

Excavations began in three alternate squares: N20, N10, 0 and E10. As E10 contained numerous large rocks, it was shortly abandoned. The other squares were excavated in six-inch layers. Material was excavated by shovel or trowel, and all of it was put through a screen. In N20, at a depth of seven inches, a small flexed child burial, with small disk beads made from bird bone, was encountered. This was cleaned off by trowel and paint brush, photographed, sketched, and removed. At a depth of five feet or more, the material from the six-inch levels was put into buckets, and then hoisted up and dumped through a screen. Then, after the profiles had been drawn of the first three squares.

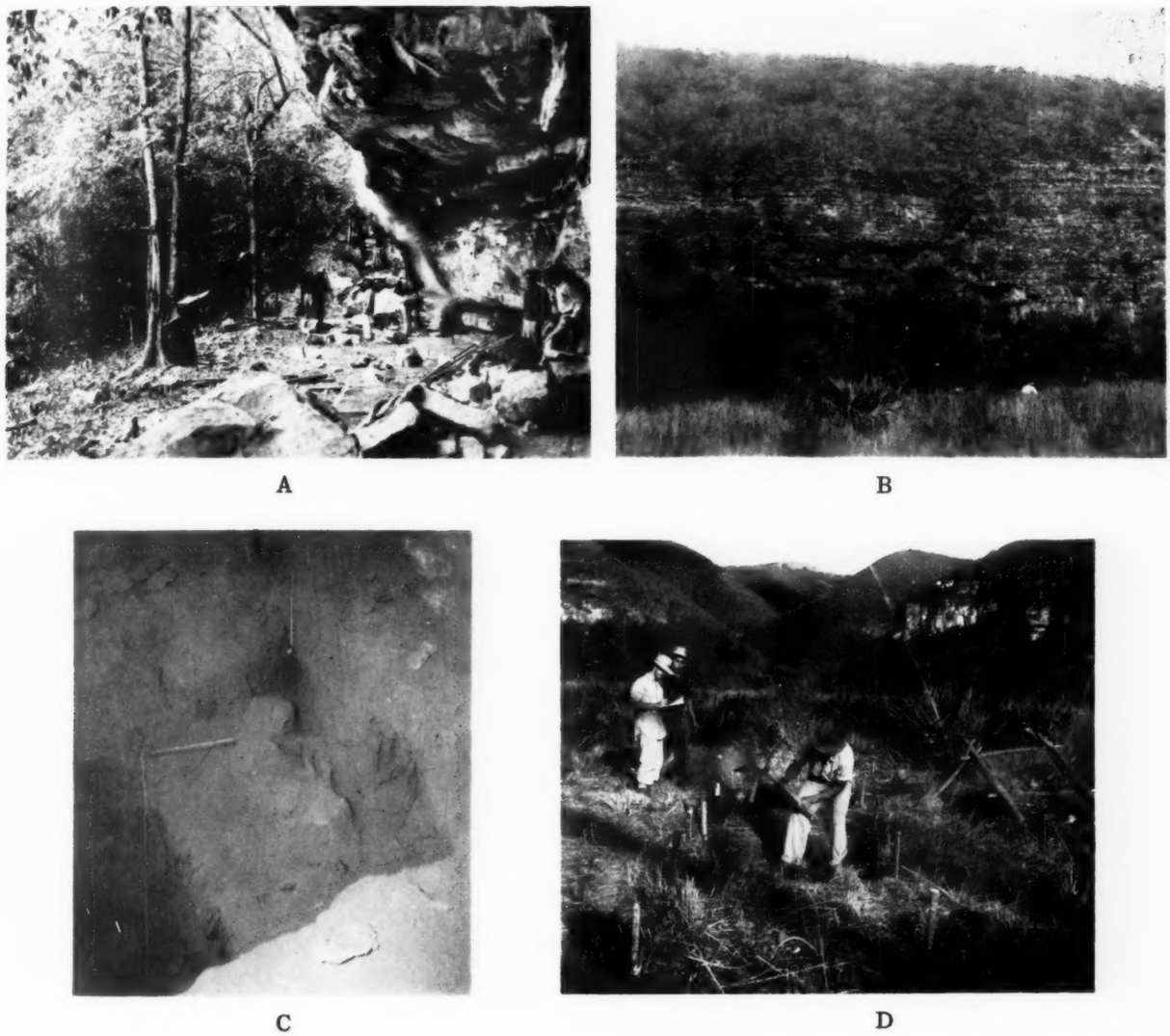


FIG. 13. Nogales Cave (Tm c 82) and Nogales Plain (Tm c 83). A. Looking at the western half of Nogales Cave (Tm c 82). B. Looking northward across the Nogales Plain site (Tm c 83) at Nogales Cave (Tm c 82) hidden by the trees at the foot of the cliff. C. La Perra flexed burial in Square N25 of Nogales Cave (Tm c 82). D. Excavation of Nogales Plain (Tm c 83) looking eastward across the Canyon Diablo.

the remaining four (N25, N15, N5, and E5) were excavated. A flexed burial (fig. 13 C) occurred in Level 5 of Square W25, which may well have been in a pit, but none was discernible in the powdery grey refuse (fig. 13 C). Quite frankly, I believe it is intrusive from Level 2 or Layer 4, as the three accompanying artifacts are of the Almagre type. Later N5W5 and N5W10 were started, but the presence of large rocks prevented their completion. At a later date Squares E40, E45, and E60 were dug down at the edge of the bank and plain. In Square 0-0, excavations were carried to a depth of eleven feet. At that depth, huge rocks halted the work, though there was every indication that more refuse lay below them. This was also true of Squares E40, E50, and E60. Limited funds, lack of time, and lack of equipment for moving large boulders stopped the limited excavation, though it was obvious that more digging under more favorable circumstances would reveal earlier and greater amounts of material.

The deposits excavated contained no definable strata, and all the material from the surface to the bottom of the excavations was in one stratum of grey powdery ash and refuse. Occasionally a short lens of white ash or charcoal could be discerned, but none was extensive enough to define as zones. In the more westerly squares, the excavation went down to the rock-covered floor at a depth of about four feet, but to the east in

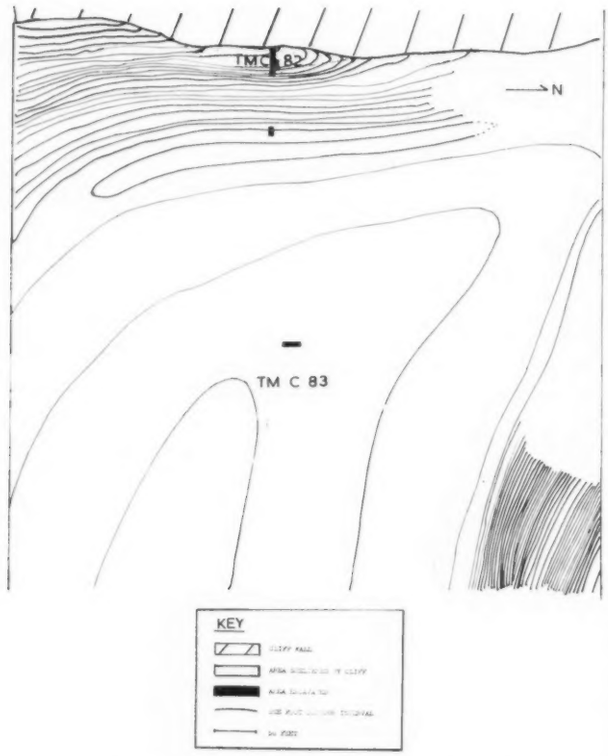


FIG. 14. Contour map of Tm c 82 and Tm c 83.

Square 0-0 and E5 the rock floor of the cave was never reached, though twenty-two six-inch levels were taken out of Square 0-0.

The excavation was extremely productive, in that over eight hundred artifacts or fragments thereof were obtained for study. Even while the excavation of the squares was in progress, artifact trends could be discerned. In most of the squares, pottery was generally at the top, finely-chipped points near the top, large triangular points in the centre and round-based points at the bottom. In the analysis of artifacts, first the materials from Square 0-0 were laid out in terms of the levels from which they came. The number of each type of artifact of each level was then placed on long strips of paper. Then the same thing was done for the adjacent squares. The individual strips from other squares were then compared with the correctly-aligned strips from Square 0-0. If a strip from an adjacent square fitted between two strips representing levels of Square 0-0 in terms of artifact trends, then it was placed in a position between the two strips on the table. For example, Level 1 of Square 0-0 had only Los Angeles pottery, small triangular points, flake scrapers, and squared metates, whereas Levels 2 and 3 had Los Angeles pottery, small triangular points, stemmed and notched points, Eslabones pottery, squared metates, and angled back metates. Level 4 of 0-0 had only Eslabones pottery, stemmed and notched points, and angled backed metates and roller manos. Now turning to Square N25, Level 1, it contained Los Angeles and Eslabones pottery, angled backed metates, and only small triangular points. When we compare Level 1 of Square N25 with that of Square 0-0, it becomes apparent that Level 1 of Square N25 is most similar to Levels 2 and 3 of Square 0-0. Because Level 1 of N25 lacked stemmed and notched points and because it had Eslabones pottery, it seemed to fall somewhere between Level 1 and Level 2 of Square 0-0. Thus its strip was aligned in that general position. Such a process continued until all the levels of every square were aligned correctly in terms of their artifact trends. Essentially this was seriating and interdigitating the levels of every square, based on the assumption that artifact styles arose, reached a maximum of production, and then died out. Then a master graph was made from the correctly aligned strips, with the levels of each square as its abscissa, the artifact type as the ordinate, and the tabular value being the number of artifacts of each type that occurred at each level of each square. Such a chart, though showing the artifact trends of each type of artifact in each square, was thought to be too unwieldy for publication and too large to show the trends graphically. Therefore, those levels having more or less the same artifact complexes were lumped together into layers (*see* the heavy black lines in figure 15 showing the layers, and the thin black horizontal lines representing the actual levels). In terms of the example of levels compared previously, Level 1 of Square N25 would be considered to belong to the same layer (Layer 2) as Levels 2 and 3 of Square 0-0 since they have nearly the same artifact assemblage. Such an analysis revealed that there were seven main layers, and that, besides the general sequence of the building of the refuse, five main artifact complexes existed.

SEQUENCE OF CULTURAL COMPLEXES

The lower pre-pottery layers or levels of Tm c 82 give evidence of a single developing artifact complex. Layers 6 and 7 represent an initial period of this culture and are considered to be components of the Nogales Phase. This early stage is marked by the dominance of Abasolo Round-base type of projectile point,[33] mortars, hammerstones, heavy crude side-scrapers, ovoid blades, flake scrapers, a few boulder metates and pebble manos, small chipped disks, an occasional chopper, a few battered pebbles, one skin smoother, two large crudely-chipped disks,[34] and a few Nogales Triangular points.[35] This early component evidently gradually developed and changed.

A later development is discernible in Layer 5. This layer is thought to contain components of the La Perra Phase. The dominant projectile point type is Tortugas

[33] *See* p. 62.
[34] *See* p. 86.
[35] *See* p. 64.

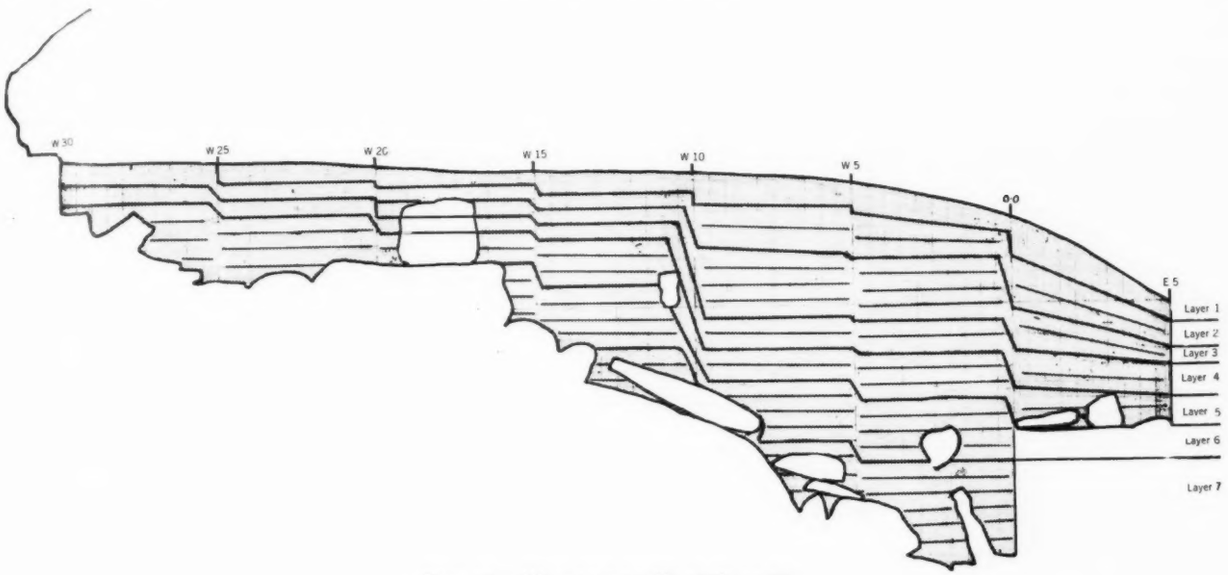


FIG. 15. West-east profile of Tm c 82.

Triangular,[36] which may be a development from Nogales Triangular. The latter continues to occur as does Abasolo Round-base. Large crudely-chipped disks almost completely replace the small ones, though a few of the latter are present. Skin smoothers are more prevalent, and only one chopper occurs. Gouges, thin or large side-scrapers, and disk scrapers continue, though they are diminishing in the later levels. Boulder metates and pebble manos, relatively rare previously, are now common, and battered pebbles are very numerous. Furthermore, a few blade fragments made by pressure flaking occur in the uppermost level. Actually a comparison of Layer 7 (early Nogales Phase) with Layer 5 (La Perra Phase) shows not only a number of individual characteristic artifact types but very definite shifts in percentages of artifacts held in common by both.

Layer 4 sees the continuation of most of the older types. There are a few minor differences in that Gary Stemmed and Ensor Side-notched points and lamellar flakes occur for the first time.[37] Until Tm c 314 and Tm c 315 were excavated, these minor differences were thought of as Late La Perra variations. However, with the excavation of Tm c 315, it was realized that La Perra developed into Almagre with Gary Stemmed points, Ensor Side-notched points, and lamellar flakes as diagnostics and therefore that Layer 4 of Tm c 82 represents the beginnings of this later cultural phase.

Layer 3 exhibits the rise of a number of new artifact types and the diminution or disappearance of a number of the older ones. I interpret the presence of such radically new elements as Pueblito pottery,[38] Morhiss Stemmed, Ensor Side-notched, and Palmillas Corner-notched projectile points,[39] roller manos, angled back metates, metate fragments made from volcanic tuff,[40] obsidian chips, and a rectangular prismatic flake knife,[41] as an occupation of the cave by a new people with a new culture. This culture may have had its origin in something like the Almagre Phase, but, if so, the developmental or transitional steps are absent in the caves that I excavated and in the parts of the Sierra de Tamaulipas that I explored. This Layer 3 of Tm c 82 is considered to be a component of the Eslabones Phase because of its pottery types.

Layer 2 sees the beginning of another new artifact complex that became dominant in Layer 1. Layer 1 is classified as a component of the Los Angeles Phase. Characteristic of Layer 1 are Los Angeles wares,[42] small triangular projectile points, including the types Los Angeles Concave, Matamoros and Fresnos Triangular, Starr Concave, and Pasitas Side-notched;[43] small flake end-scrapers, rectangular manos, metates, finely-chipped triangular and ovoid blades, and pointed prismatic flake knives.[44]

SUMMARY

As far as could be determined by limited excavations, the first occupation was by the Nogales peoples, who laid small amounts of refuse on the inner cave floor and poured considerably more over the edge of the sloping cave floor. These people used pebble manos and boul-

[36] *See* p. 64.
[37] *See* p. 67.
[38] *See* p. 105.
[39] *See* p. 67.
[40] *See* pp. 92–93.
[41] *See* p. 81.
[42] *See* p. 105.
[43] *See* p. 70.
[44] *See* p. 81.

der metates and were probably primarily food-gatherers (or perhaps, to a limited extent, incipient agriculturists). The large amounts of refuse laid down by this group may indicate that they occupied the cave constantly or intermittently for a considerable length of time. Gradually these earlier peoples' cultures changed to one I call the La Perra Phase. These later people (on the evidence from Tm c 174) most certainly both foraged and practiced agriculture. They also spread refuse in the interior of the cave and over the edge of the floor until the floor was considerably extended. The La Perra people gradually changed until they had a different type of culture, which is called Almagre. The refuse of these people was again spread over the floor in a relatively thin layer. During their occupation a semi-flexed burial was deposited in the back of the cave. Following this culture there was an occupation of the cave by Eslabones people with a radically different cultural complex. Probably the permanent homes of these people were in the ruins on the hills around the canyon. They may very well have occupied the cave during the season in which they worked in the cornfields in the plain in front of the cave. The final aboriginal occupation was by the Los Angeles peoples who laid down small amounts of refuse in the cave, buried a child in the back of the cave, and, as we shall see later, also occupied the plain in front of the cave.

4. ARMADILLO CAVE (Tm c 314)

Armadillo Cave is situated on the east side of Calabaza Canyon about three miles east of the village of El Almagre in the southern Sierra de Tamaulipas (fig. 5, p. 20). The headwaters of Canyon Calabaza are in the central part of the mountain range not far from the upper branches of the Canyon Diablo. In structure, Canyon Diablo and Canyon Calabaza are much the same. Both have steep limestone cliff-walls overlain by volcanic materials. There is a tendency for these volcanic materials to be considerably deeper along the Canyon Calabaza. The beds of both canyons are sinuous and are flanked by three alluvial terraces, the two higher ones of which are quite prominent. Canyon Calabaza differs from Canyon Diablo in that it drains southeastward.

The cave itself is large, about seventy feet wide and sixty feet deep (fig. 16), and has a triangular floor about thirty-five feet above the arroyo bed and just slightly lower than the top of the high terrace. The walls of the cave are steep and come to a vaulted roof about one hundred feet above the floor. All but the northern one-third of the cave floor and a portion against the back wall of the cave is covered by huge boulders that have fallen from the roof above.

Tm c 314 was discovered in 1953 and excavated by Peter Pratt in March of that year. The mouth of the cave, besides having some rock-fall on it, is pitted with Armadillo holes and exposed to moisture. For this reason no excavations were attempted in that area. In the excavation, an L-shaped trench was dug along the north edge of the rock-free portion of the cave and near the edge of the back wall. In the initial survey, Pratt and I found a small bed of vegetable material in this area, and surface collections indicated a wide variety of artifact types. For this reason the cave seemed most promising.

Initially, alternate five-foot squares were excavated in a line along the north wall of the cave. Later the squares in between were removed to form a forty-five-foot-long trench. Then a trench twenty feet long was excavated at right angles to our first excavation along the side wall. As, in excavating this trench, one wall often impinged upon the area of rock-fall in the centre of the cave, it was most difficult to record the soil profiles of the whole trench. In the actual excavation, the top distinguishable layers of cave dust, ash, soil, and vegetable materials were stripped off by a trowel, and the debris later was screened. These distinguishable layers extended to a depth of from one to two feet. Below them, clearly distinguishable zones were not discernible. We therefore changed our methods and excavated this section in arbitrary six-inch levels to a depth of about five feet or until large rocks were encountered.

Covering the entire floor of the cave was a one- to four-inch layer of brownish cave dust, called Zone A (fig. 16). Underlying it at the mouth of the cave was a layer of ash or brownish soil (perhaps partially disintegrated vegetable material) mixed with cave dust. Toward the back of the cave this brownish grey ash gradually changed into the vegetal layer (Floor 1) underlain by grey, white, or brown ash. This habitation layer was called Zone B. In the northeasternmost squares, at the junction of our two trenches, two other floors of preserved remains overlaid by ash were found underneath the vegetable layer. These were called Zone B-1 and Zone B-2. To the south these again disappeared and gave way to an ash level. Except for the regions at the extremities of the trench, these lenses were over layers of grey compact ash, filled with rock and bone fragments, called Zone C. In a few places this zone reached a depth of five feet. There were no clearly defined horizontal floors or evidence of bedding in it. This zone in turn overlaid yellow-brown compact terra rosa soils (Zone D) or rock. At the extremities of the trench, Zone B lay directly over Zone D with no intervening ashy layer.

Level 1 came from Zone A; Levels 2 and/or 3 came from Zone B; and Levels 3 and/or 4, and/or 5 came from Zone B-1 and B-2. Levels 3 and/or 6 to 12 came from either Zone C or Zone D. In the analysis, the materials from each level were laid out according to zones, square by square, and compared. It soon became apparent that all the archaeological materials from Zone A, Zone B, Zone B-1, and Zone B-2 were almost identical. For this reason they have been lumped to-

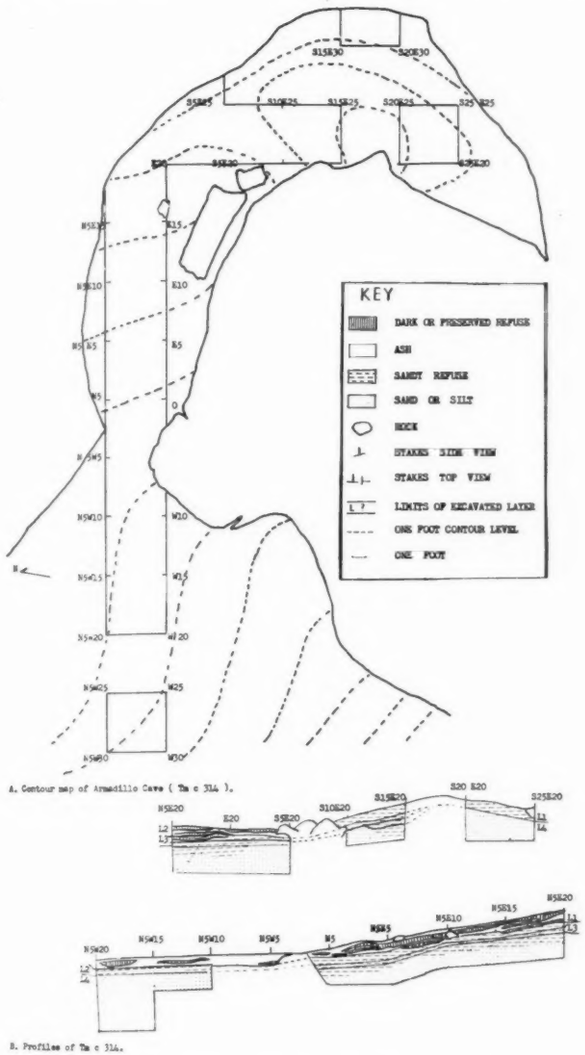


FIG. 16. Contour map and profiles of Tm c 314.

gether into analysis Layer 1. As the materials at the junction of Zones B and C were entirely different, these levels were considered as being analysis Layer 2. When the various levels of Zone C were compared, it was evident that there were two kinds of archaeological materials in them: those from the top six inches and those from the half below that. These two portions of Zone C were called analysis Layers 3 and 4. A further confirmation of this break within Zone C came when the osteological remains were studied. The top portion of Zone C contained bone of which only a few fragments were fossilized, while all the bones from Layer 4 were heavily mineralized.

Layer 4 from the lower Zone C contained twenty-nine artifacts. These stone tools, or fragments thereof, included Abasolo Round-base, Nogales Triangular, and Tortugas Triangular projectile points,[45] gouges, large crude plano-convex end-scrapers, crude point fragments, thin and thick flake side-scrapers, bifacial blade fragment, a small crude disk chopper, and a fragment of a possible spoke shaver.[46] This complex of tools is like that found in Level 3 of Tm c 81 and Layers 6 and 7 of Tm c 82, components of the Nogales Phase. Although the shell, disk, tubular, effigy and Marginella beads uncovered in Layer 4 of Tm c 314 are unique, they certainly do not warrant classifying it as anything other than a component of the Nogales Phase.

In the upper part of Zone C, in Layer 3, twenty-four artifacts occurred. The projectile point complex consists of Abasolo Round-base, Nogales Triangular, Tortugas Triangular, Almagre Contracting-stem, and Gary Contracting-stem points,[47] as well as a number of crude point tips. These artifacts, plus a crude lamellar flake, bifacial blades, keeled ovoid end-scrapers, stone pendants that resemble pierced bear canines, thin flake side-scrapers, a thick flake side- and end-scraper,[48] constitute a congeries of tools different from that previously described and a little like that found in Layer 4 of Tm c 82. This assemblage of artifacts from Layer 4 of Tm c 314 is considered to compose a component of the Almagre Phase. Later excavation at Tm c 315 gave abundant artifactual evidence of the existence of such a phase.

In the levels from the junction of Zone B and Zone C, called Layer 3, the first pottery occurred. These thirty-seven sherds belong to eight types. Four sherds were traded in from the Huasteca and belong to two types of the Zaquil Period (IV): Zaquil Incised and Zaquil Red.[49] The other sherds were of local origin and belong to La Salta Polished, Pueblito Plain, La Salta Black, Pueblito Brushed, Eslabones Red, Pueblito Molcajete types.[50] Occurring with the sherds were sixteen projectile points, including Ensor Side-notched, Palmillas Corner-notched, Morhiss Stemmed, Armadillo Stemmed, Catan Round-base, and San Fernando stemmed types, as well as a strange-looking corner-tanged point (Aberrant Type 9).[51] This sort of complex had not occurred in the excavations previously described, but the pottery and some of the projectile point types were like those found in Tm c 78 and in the upper levels of Tm c 79 which are considered to be typical components of the La Salta Phase. Also occurring in Layer 2 were bifacial blades, an Almagre Contracting-stemmed point and Tortugas Triangular point, point tips, a Marginella bead, a large plano-convex and keeled end-scraper, thick side-scraper, and a crude lamellar flake. Some of these items may have actually been made by the La Salta Phase peoples, but

[45] *See* pp. 62–64.
[46] *See* pp. 75–81.
[47] *See* pp. 62–65.
[48] *See* pp. 75–80.
[49] *See* p. 120.
[50] *See* pp. 114–116.
[51] *See* pp. 67–74.

I suspect that many of them were made earlier and, because of diggings and our own method of excavation, were included in the same level as those of the brief La Salta occupation.

The bulk of the artifacts from this cave came from Layer 1. Most of the sherds were Los Angeles ware of three types: Los Angeles Brushed, Los Angeles Plain, and Los Angeles Black.[52] Also present in this zone were a number of trade sherds from the Panuco Period (VI) of the Huasteca. These included Huasteca Black-on-White, Tancol Brown-on-Buff, Tancol Polychrome, Zaquil Black, Las Flores Molcajetes, Las Flores Engraved, and a few sherds of heavy plain ware.[53] There were also a very few sherds that this later occupation had probably dug up from Layer 2, as they were Pueblito ware types. Present as well were a number of new projectile point types: Matamoros Triangular, Catan Round-base, Diablo Corner-notched, Starr Concave, Fresnos Triangular, and Los Angeles Concave.[54] This group of finely-fashioned projectile point types, as well as Armadillo Stemmed, the Los Angeles ware pottery, a stemmed scraper, a bone tubular bead, square-based blades, a rectangular metate fragment, flake end-scrapers, whetstones, fragments of twilled mats, yucca string, cane cigarettes, leather, a wooden spindle whorl, whittled sticks (some probably fragments of arrow points), an agave string, cotton string, a clay pipe stem, ladle, a flute made from cane, incised bone, a bone awl, bifacial ovoid blades, a pointed lamellar flake, and distinctive vegetal materials including Breve de Padilla corn, are considered to be diagnostic traits of the Los Angeles Phase. Most of these traits are represented in the top level of Tm c 81 and of Tm c 82. In the upper levels of Tm c 314 a number of other artifacts occur which I believe belong to earlier components. They include small disks, choppers, gouges, Abasolo Round-base, Nogales Triangular, Tortugas Triangular, Almagre Contracting-stemmed, Palmillas Corner-notched, Ensor Side-notched, and Morhiss Stemmed points, spoke shavers, ovoid keeled end-scraper, and crude lamellar flakes. Two types of artifacts found are especially significant. They are trade items showing that the Los Angeles Phase lasted into historic times; seven sherds of Spanish Yellow Glaze ware and an ear-spool made from brass. Other trade objects, several Huastec sherds and one from Arkansas, were also present.

Thus Armadillo Cave yielded four stratified components of the Nogales, Almagre, La Salta, and Los Angeles Phases. The three earlier ones were represented by poor samples. However, the Los Angeles component had a large number of artifacts, which broadened our knowledge of the phase, as well as abundant well-preserved food remains which revealed that the subsistence complex of these ancient peoples was based mainly on corn and squash agriculture, supplemented by considerable hunting and some food-gathering.

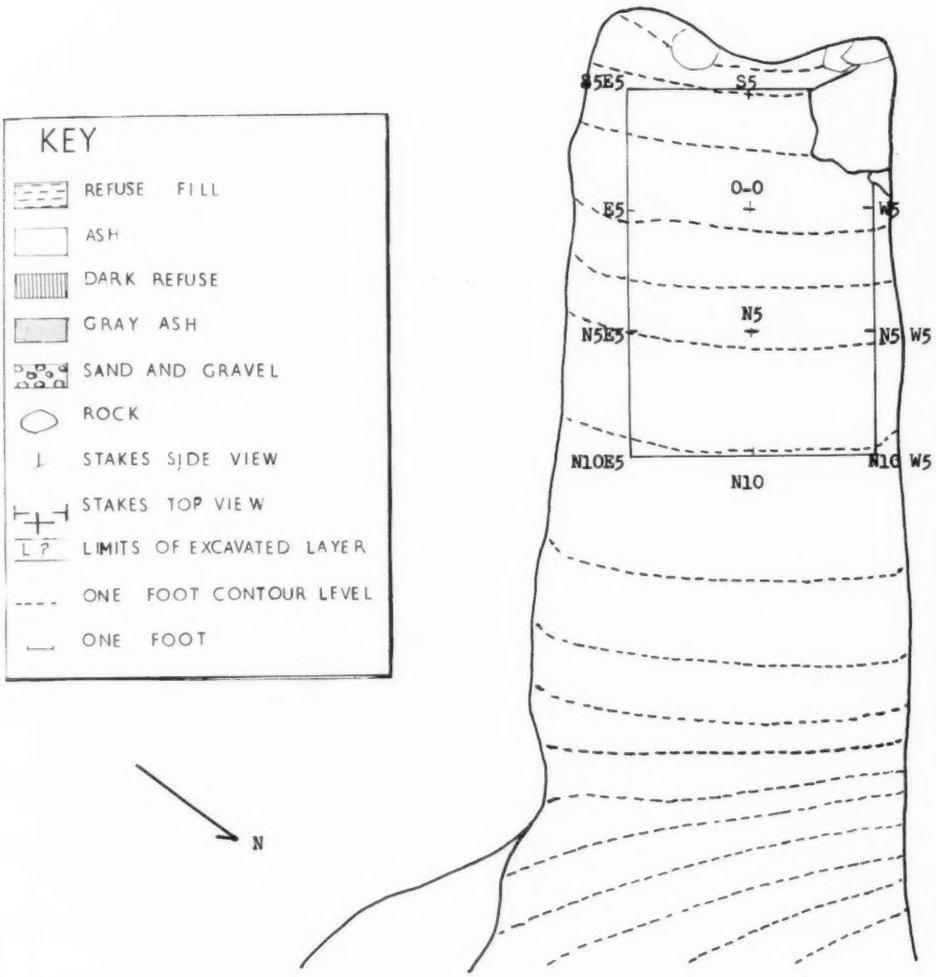
[52] *See* pp. 119–120.
[53] *See* pp. 120–121.
[54] *See* pp. 68–70.

5. CUEVA HUMADA (Tm c 315)

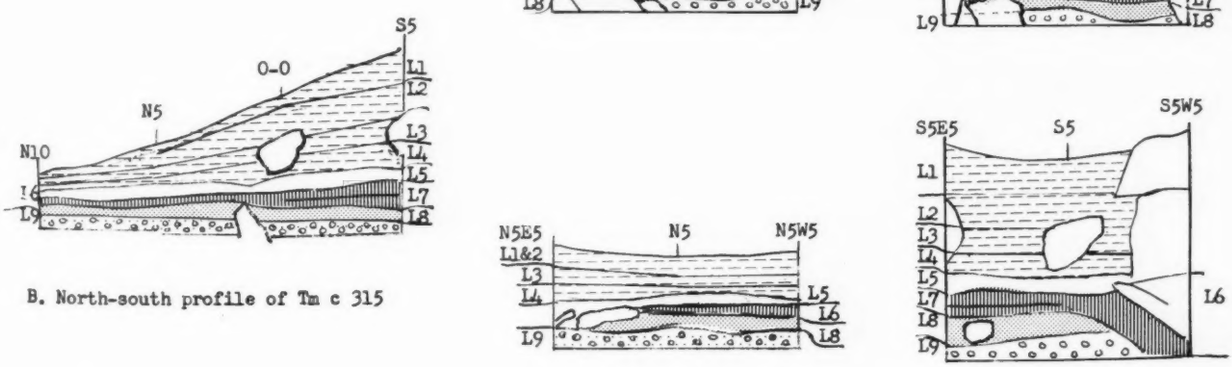
Cueva Humada is located in the Canyon Calabaza about three miles north of where the trail from Rancho Almagre enters the gorge (fig. 5, p. 20). It has a ninety-foot long, narrow, V-shaped floor about forty-five feet wide at the entrance and nine feet wide at the back. Its sides are steep, running into a domed roof about seventy-five feet above the highest part of its floor. At its back a twenty-five-foot-high cliff leads to a tunnel-shaped cave which extends back about two hundred feet to a wall leading to the surface of the ground above the cliff. This upper cave had no refuse on its floor, though artifacts appeared in crevices along its sides. This I have interpreted as indicating that this upper cave was once occupied but that most of its artifacts and refuse have been washed down onto the floor of the lower cave. The lower cave has an ashy floor that gradually slopes into the canyon bed, forty-two feet below its most elevated portion.

Peter Pratt and I discovered this cave in February of 1954. Initial testing yielded pre-pottery artifacts thickly concentrated in grey ash, along with a few preserved leaves and carbon. In the hope of finding preserved vegetable remains with pre-pottery tools, a six-man crew and I conducted a week of excavation in March of 1954.

In the excavation, an area in the back of the cave fifteen feet long and ten feet wide was dug down to a gravel layer about thirty-five feet above the arroyo bed (fig. 17). In excavating, we worked on a vertical profile, stripping off actual soil layers or arbitrary six-inch layers. The stratigraphy revealed that the top deposit was an unbedded grey ash layer (Zone A), that near the front of the trench it was one foot thick, but that at the back of the cave it was five feet thick. Levels 1 to 4, considered to be the refuse washed down from the upper cave on to the floor of the lower cave, were taken from this zone. Underlying it was a more or less horizontal stratum of white ash, two inches thick near the front of the cave and six inches thick at the back. In the back portion of this zone (B) were occasional small lenses of charcoal representing either floors or hearths of the occupants who deposited this floor. Level 5 came from this zone. Zone C was a layer of charcoal under the white ash. It was one inch thick in the front of the cave and three-quarters of a foot thick in the back of our trench. This floor was just about level, being twenty-five feet above the arroyo bed. Level 6 came from the top six inches of this charcoal. Level 7 was the lower portion of the same stratum where the charcoal was over one-half foot thick, as well as the material in a pit that extended down from this Zone C. This pit was in the southwest portion of the trench and oval in outline, about four feet in diameter.



A. Contour map of Cueva Humada (Tm c 315) .



B. North-south profile of Tm c 315

C. East-West profiles of Tm c 315

FIG. 17. A. Contour map of Cueva Humada (Tm c 315). B. North-south profile of Tm c 315. C. East-west profiles of Tm c 315.

A

B

C

FIG. 18. Eslabones Ruin (Tm r 86). A. Looking eastward across the plaza at the conical pyramid. B. Looking northward across the secondary plaza where the excavation took place. Note masonry house-platform in the background. C. Southwest wall of the excavation. Note the superimposed house floors.

and one and one-half feet deep. In it was a flexed burial without artifacts. As a large rock extended over the head and chest portion of this burial, it was never completely excavated. Underneath the charcoal was a thin layer of brownish-grey clay, Zone D, from two to six inches thick, which gradually blended into the underlying gravel, Zone E. Level 8 was stripped from the top of Zone D, while Level 9 was from the junction of this zone and the gravel.

Culturally the top layer was mixed and probably represented the occupations that occurred in the upper cave. Artifacts included Abasolo Round-base points, Tortugas Triangular points, Nogales Triangular points, Almagre Stemmed points, Gary Stemmed points, one Lerma point, six aberrant Kinney points, and one Pogo point.[55] Besides these projectile points there were a number of scrapers including plano-convex disk scrapers, keeled teardrop-shaped end-scrapers, gouges, and side-scrapers.[56] Other artifacts were choppers, bifacial blades, large and small bifacial disks, pebble manos, boulder metates, and a single pebble hammerstone.[57] Below these mixed remains were two components of the Almagre complex. One was in Zone B, Level 5, while the other was in Zone C, Levels 6 and 7. These relatively thin zones were abundant in artifact remains. Projectile points included Abasolo Round-base, Nogales Triangular, Almagre Stemmed, Gary Stemmed, Kent Stemmed, Palmillas Corner-notched, and one aberrant point of Flacco Indented base.[58] The scrapers and blades were very much like those of the horizon above it, except that they were much more abundant. Underneath the floor in Zone D was a La Perra component. It included Abasolo Round-base, Tortugas Triangular, and Almagre Stemmed points.[59] Other artifacts that were much less numerous than in the above layers included disk scrapers, large nodule scrapers, a few flake side-scrapers, one keeled teardrop-shaped scraper, and a single gouge. There were both square-base and round-base blades, three large bifacial disks, one spoke shaver, and two small bifacial disks. Grinding tools included two pebble manos, two boulder metates, and two pebble hammerstones.

Besides the artifactual remains in the cave, there were a number of fragments of animal bone. Most of the identifiable bones were those of deer, and they are interesting because of the fact that the Mazama tropical deer was fairly well represented in the La Perra occupation but there was only one bone of the white-tail deer.[60] On the other hand, the Almagre horizon saw bones of the white-tail deer and tropical Mazama deer appearing in about equal numbers. Thus there was not only a shift in artifacts from the La Perra to the Almagre horizon, but also a shift in fauna.

[55] *See* pp. 62–73.
[56] *See* pp. 75–81.
[57] *See* pp. 85–88.
[58] *See* pp. 62–73.
[59] *See* pp. 62–64.
[60] *See* pp. 139–143.

6. CERRO DE GUADALUPE RUIN (Tm r 86)

Cerro de Guadalupe was visited during the season of 1946 in the company of Roberto Pavon and Pedro Lerma. Like many of the other ruins in the area, grass hid its artifacts, and a surface collection did not yield an adequate sample. For this reason a trench was put in one of the small plazas, and the top soil was removed from two house platforms. These gave us only a small sample of materials; more would be very desirable.

The ruin is situated on the eastern top half of Guadalupe Mountain and represents the most eastern extension of the ruins that I found.[61] It is located at longitude 98° and latitude 23½° and is about four miles west of the Eslabones Ranch (fig. 5, p. 20). The site consists of about three hundred round masonry house-platforms and one large round pyramid (fig. 19). The round house-platforms have an outer masonry wall about three feet high; the inner portion of the platform is filled with large rocks and refuse to the level of the outer walls (fig. 18). About half the houses have steps leading from the ground level to the surfaces of the platforms. In the eastern part of this ruin is a rectangular plaza surrounded by twelve house-platforms with a large round pyramid in the northern side of the plaza (fig. 18). East of the large pyramid is a depression (called a *tanque* by the natives) now holding water, which probably was a source of water for the inhabitants of the site. Whether it was artificially constructed could not be determined.

METHOD OF EXCAVATION AND ANALYSIS

Excavation took place in a small secondary plaza southwest of the main plaza (figs. 18 and 19). This area was chosen because a modern waterhole for cattle indicated that prehistoric deposits extended to a depth of at least three feet. The excavation consisted of a fifteen- by five-foot trench running east and west. The trench was dug to a depth of five feet, at which point sterile soil was encountered, though cultural material stopped at about four feet. The trench was excavated in six-inch levels. As the soil was hard-packed clay, the method employed in digging was the vertical slicing technique with a mattock. This technique facilitated the digging of exact six-inch levels, as well as clearly exposing house floors. Five superimposed prehistoric burned clay floors were found, but unfortunately artifacts from the lower three were few (fig. 18). Only 2,599 sherds were found in the excavation, and 300 in the surface collection or soil stripping.

In the analysis a large table was first marked off in terms of the five main levels of the trench. Then the

[61] A. Prieto, 1873—probably the Guadalupe site mentioned on page 82.

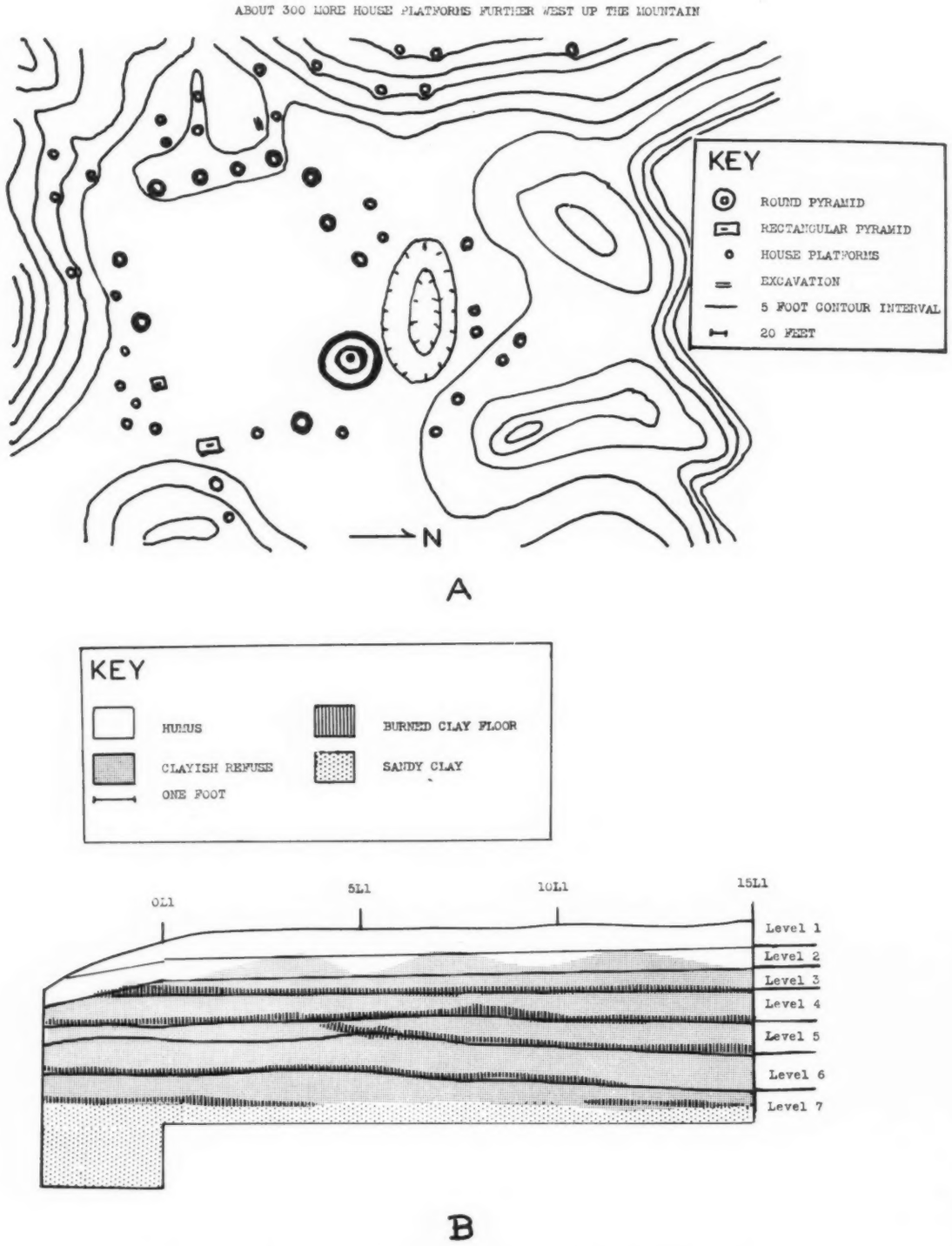


FIG. 19. A. Sketch of main plaza of Tm r 86. B. Profile of trench at Tm r 86.

sherds from the various levels of the trench were laid on the table in the correspondingly-marked level. Next the sherds were divided into large series of categories (trial types). These categories were based upon features of paste, surface finish, shape, and decoration. The categories were then compared, one level with another, in order to ascertain which trial groups evinced distinctive and significant stratigraphic changes. After

much experimenting, it became apparent that only five of the original (about forty) trial types had definite temporal or stratigraphic significance and were adequately represented. These became the five pottery types: La Salta Polished, La Salta Black, Pueblito Plain, Pueblito Brushed, and Eslabones Red.[62]

Various changes were noted. In brief, they are the following: La Salta Polished and Pueblito Plain gradually increased through the levels, while Eslabones Red and La Salta Black decreased. Pueblito Brushed stayed about the same. In terms of vessel feet, the large solid conical ones gradually died out and were replaced by small solid conical ones and large hollow conical ones. In vessel forms, the changes were not too well marked. However, a few do seem worth noting. Bowls with basal ridges died out in the early levels, and hemispherical bowls were on the decline, while outsloping carinated bowls and carinated bowls with vertical sides and outsloping rims seemed on the increase. Generally speaking, there seemed to be general shift of trends between Levels 3 and 4, so I have tentatively classified the materials from Levels 4 through 7 as belonging to the Laguna Phase, while those from Levels 1 through 3 are considered to belong to the Eslabones Phase.

Other artifacts found in the excavation were extremely rare. From Levels 6 and 7 came one rectangular obsidian flake knife; in Level 5 there was a strap-handle of a vessel; Level 4 yielded three ladle handles and a body fragment of a figurine. Layer 3 contained a fragment of a Morhiss Stemmed projectile point, a part of a hand-modelled figurine's head, too badly eroded to identify as to type, and one roller pestle and an obsidian chip. Layer 1 had no objects other than sherds.

Surface collection and soil-stripping excavation at the site, besides yielding pottery, contributed part of a mortar, an angled back metate, and a bell-shaped pestle.

7. LA SALTA RUIN (Tm r 79)

Under the guidance of José Lerma, I visited the La Salta Ruin in the spring of 1946 accompanied by Pedro Lerma and Roberto Pavon. This ruin is located about four miles northeast of the town of Piedras Negras and about six miles northwest of the town of Los Angeles. More exactly, it is on a hill just west of the junction of the Cazuelas Canyon with La Salta Canyon (which runs northeast and appears to be a branch of the Canyon Diablo or the Soto la Marina River) (fig. 5, p. 20). Owing to dense vegetation it was not totally explored, but it may be as large as any of the other ruins discovered. Thirty round stone masonry structures were noted as well as four larger pyramids that may surround a plaza. The house and pyramids were of interest in that all had steps. The steps on the pyramids were flanked by stone walls.

[62] *See* pp. 114–116.

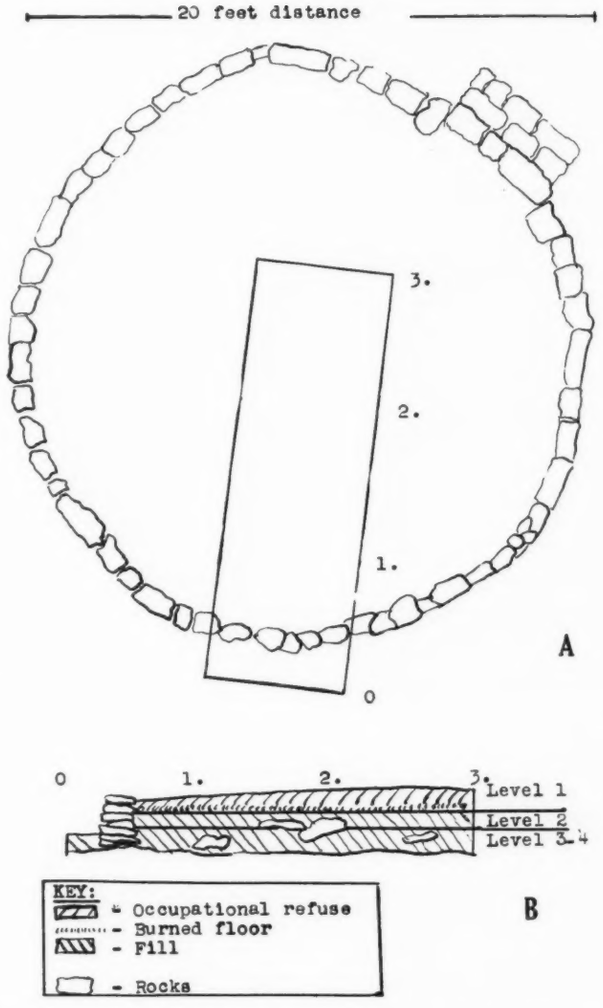


FIG. 20. A. Map of La Salta Ruin house-platform with area excavated indicated. B. Cross-section of La Salta Ruin house-platform.

Also noted were terraces bounded by stone walls which connected a series of round masonry structures on the edge of the hill or its sides.

METHOD OF EXCAVATION AND ANALYSIS

After preliminary mapping and photographing, one trench fifteen feet long and five feet wide was sunk into the top of one of the round buildings. The top level of this excavation was dug from four inches to six inches deep, and the other two levels at six inches each; basic caliche soil was encountered at a depth of two and one-half feet. This excavation not only gave us stratigraphic trends of sherds but also explained the function of these round masonry structures (fig. 20).

The excavation revealed a four- to six-inch layer of refuse capping the structure, and a two-inch-thick

stratum of burned clay and wattle-and-daub at a depth of about four inches. This stratum, undoubtedly an occupational level, blended into the top of the surrounding masonry stone walls. Below this floor a two-foot zone of refuse materials, sherds, and occasional boulders were found but no more floor levels. The above data may be interpreted as follows: the inhabitants first constructed circular masonry stone walls to an elevation of about one and one-half feet and then filled the area inside the walls with whatever materials were handy, such as refuse and rock. Then on top of the walls and fill, they constructed a house of wooden beams and wattle-and-daub. The fact that the steps lead from the ground to the top of the structure supports the hypothesis that these circular masonry walls were the walls of a house-*platform*, not the walls of the house. On the basis of the shape of the platform, it is probable that the outlines of the houses were circular.

The sherds from the excavations tend to confirm the concept of two periods of refuse accumulation. The later refuse was deposited by the people who built and lived on top of the house-platforms; in the process of building the platforms, the refuse of an earlier occupation was used as fill.

For study, the sherds were first laid out according to the levels from which they came. They were then classified according to the types determined at Tm r 86, and the sherds from each level of La Salta ruin were compared with each other. Later the trends of Tm r 79 were compared with those from Tm r 86.

The trends were very similar to those from Tm r 86, though many of them in terms of percentages (particularly in the top levels) seem to be a further extension of those initiated in Tm r 86. Eslabones Red not only diminished but actually died out, whereas both La Salta Polished and La Salta Black only diminished. Pueblito Plain very definitely increased, but Pueblito Brushed stayed about the same. Vessel feet showed considerable change with the large solid conical feet dying out early; the large hollow conical ones, however, continued to increase. For this reason the lower levels were considered as being Eslabones Phase while the top levels, with a new complex of pottery, was called La Salta.

Objects found in the excavation, other than sherds, were relatively few. Found in the top level was a single mould-made figurine head. The headdress is simple and is represented by a single clay band in the form of an inverted truncated wedge. Two circular earplugs appear at the side of the head and are about one-half the length of the face. The eyes are merely incised horizontal lines, while the eyebrows or supra orbital ridges are bands of slightly raised clay. The back of the head is slightly concave. In general appearance the head is very similar to some of those of the mould-made type found by Ekholm at Panuco,[63] and to a figurine illustrated by Gamio from the later periods of Tetihuacan[64] (fig. 42).

Also found in Level 1 were parts of roller manos, metates, rectangular blades, points and figurines.

8. NOGALES PLAIN (Tm c 83)

In front of Nogales Cave, Tm c 82, is the top of the high terrace. This terrace top is approximately level and is about one-quarter mile wide and one-half mile long. Surface collections indicate that there were numerous occupations on this plain (Tm c 83). In the east part are the outlines of two circular house-platforms with Eslabones Phase pottery. However, in the western section, about four hundred feet in front of the cave (Tm c 82), there was on the surface a considerable amount of Los Angeles pottery and many small triangular points as well as a large section of a rectangular metate made from volcanic tuff.

Since this appeared to be a relatively "pure" Los Angeles site and since it was convenient to my camp in the Nogales rock shelter, a north-south trench, twenty feet long and five feet wide, was sunk into the plain in 1949 (fig. 14). This trench was dug in six-inch levels, and all materials were screened. The trench revealed a four-inch humus layer, under which about six inches to one foot of dark sandy refuse overlay culturally-sterile yellowish-red sands. Of interest in the trench, extending downward from the humus layer, were five large post holes which described an arc. These I believe can be fairly safely assigned to the Los Angeles occupation and may represent the wall of a circular or elliptical house.

In ceramics, there were 143 sherds of Los Angeles ware, 17 of Pueblito ware and 3 of trade wares.[65] Of the 17 Pueblito ware sherds 11 came from the lower two levels; the top level is a pure Los Angeles level and the other levels are almost so. In terms of ceramic trends Los Angeles Brushed[66] was dominant in all levels, though Los Angeles Plain[67] increased at the former's expense in the upper levels. Los Angeles Black[68] was represented by only one sherd in the top level while Nogales Corrugated[69] appeared in both Levels 1 and 2. The latter was proportionately more prevalent in the earlier level.

Projectile points[70] were mainly of the small triangular types, though one Armadillo Stemmed occurred in Level 3 and one Tortugas Triangular in Level 2. Starr Concave appeared in all levels, while Matamoros Tri-

[63] Ekholm, 1944: 38*a*.

[64] Manuel Gamio, La Población del Valle de Teotihuacan. *Secretaría de Agricultura y Fomento, Dirección de Antropología*, Tomo 1 (Mexico, 1922), Lámina 91.

[65] *See* pp. 114–116.

[66] *See* p. 119.

[67] *See* p. 119.

[68] *See* pp. 119–120.

[69] *See* p. 121.

[70] *See* pp. 69–70.

angular was only in Levels 1 and 2. A Diablo Corner-notched point occurred in Level 2.[71]

Other objects found include a fragment of a rectangular or square metate, flake scrapers, pointed prismatic flake knives or scrapers, and a finely-chipped triangular knife.

9. SURVEYED SITES (Fig. 5)

Tm c 305

Tm c 305 is a large site around the buildings at Rancho Sabino Gordo, east of Aldama, just southeast of the Sierra de Tamaulipas (fig. 5, p. 20). In this area of about one and one-half acres was a profusion of chips and artifacts. This seemed to represent either a large series of seasonal camps or a small village. The four Abasolo Round-base, four Matamoros Triangular, three Tortugas Triangular, two Gary Contracting-stem, one Catan Round-base point, one Armadillo Stemmed point,[72] and disk scraper [73] collected justified classifying the site as a component or components of the Almagre Phase. West of these materials, on the high bank just above the waterhole, three excavations for clay had been undertaken. Cleaning of the walls of these excavations revealed four half-inch lenses of clay, about four to seven feet long, which contained chips. Search in the back-fill from these holes yielded seven small Lerma Double-pointed points [74] and a crude chopper. These charcoal lenses are considered to be four temporary camps of the Lerma Phase.

Tm c 89

A small area (twenty yards in diameter) of chips along with two Abasolo Round-base points [75] and a flake side-scraper occurred on the high terrace west of the junction of Canyon Yucate and the Eslabones–Los Angeles trail in the Sierra de Tamaulipas (fig. 5, p. 20). This is classified as a Nogales camp.

Tm c 290a

This site is just northeast of the eastern waterhole of Los Angeles Ranch in the northern Sierra de Tamaulipas (fig. 5, p. 20). Here Peter Grant noted chips and artifacts over an area one hundred yards in diameter and picked up five Abasolo Round-base points,[76] two Tortugas and Nogales Triangular points,[77] one Catan Round-base [78] point, thirteen crude point tips,[79] seven large blade fragments, two large crude side-scrapers, two thin flake side-scrapers, one small disk chopper, one gouge, and one fragment of a square-based blade.[80] This assemblage indicates that the site represents a Nogales occupation.

Tm c 313

This large deep limestone cave is in the Canyon Calabaza in the southern Sierra de Tamaulipas. Deposits of refuse and limestone may be over six feet in depth. A gouge, a chopper, and possible Abasolo Round-base point [81] suggest a Nogales occupation.

Tm c 176

This site is twelve miles north of Cave Tm c 174 on the west side of the Canyon Diablo. Artifacts include one Abasolo Round-base point,[82] one thin flake side-scraper, three thick side-scrapers, and one pebble mano. This is considered to be a Nogales site. It also had "tally mark" type pictographs on one wall.

Tm c 177

This site is situated one mile south of La Perra Cave on the south side of the Canyon Diablo above a steep talus slope. As two Abasolo Round-base points and a Nogales Triangular [83] were found on the surface, it is considered to be a Nogales Phase site.

Tm c 317

This site is at the Ejido de las Yuccas in the southeast Sierra de Tamaulipas on a high terrace above the arroyo. Chips were scattered over an area about fifty feet in diameter. As two Tortugas Triangular points were found here, the site is thought to belong to the La Perra Phase.[84]

Tm c 189

Tm c 189, in the eastern outskirts of Ciudad Victoria, is a plaza in the form of an equilateral triangle about one hundred yards wide, just across from Tamatan school. The presence of two Abasolo Round-base points, two Tortugas Triangular points, a Catan Round-base point,[85] a small and a large chipped disk indicates that it is an open site of the La Perra Phase.

Tm c 175

This cave, a narrow east-facing shelter about twenty feet long, is four miles north of the entrance of La Perra Canyon into the Canyon Diablo. Found on the surface

[71] *See* p. 70.
[72] *See* pp. 62–69.
[73] *See* p. 79.
[74] *See* p. 62.
[75] *See* pp. 62–63.
[76] *See* p. 62.
[77] *See* p. 64.
[78] *See* p. 68.
[79] *See* p. 61.
[80] *See* pp. 75–81.
[81] *See* p. 62.
[82] *See* p. 62.
[83] *See* p. 64.
[84] *See* p. 64.
[85] *See* pp. 62–69.

of its ashy floor were a crude chopper, two Abasolo Round-base points, a Tortugas Triangular point, and fragments of two Kent Stemmed points.[86] It has "tally marks" pictographs on one wall. It is an Almagre occupation.

Tm c 175a

This open site is on the high terrace just below Cave Tm c 175, four miles north of the entrance of La Perra Canyon into the Canyon Diablo. Found on the surface were three large side-scrapers and a Tortugas Triangular point.[87] It is considered to be a La Perra component.

Tm c 179

This large open site is on both sides of the road from Ciudad Victoria to Villa Casas on top of the high terrace just east of Arroyo Grande. The presence of an Abasolo Round-base point, Nogales point, and a Gary Stemmed point[88] indicates an Almagre occupation.

Tm c 291

This is a large (one hundred eighty feet long, twenty feet deep) rock shelter at the head of Yucate Canyon in the central Sierra de Tamaulipas. It is probably stratified, but the artifacts on its surface, without pottery, suggest at least an Almagre Phase occupation. There were two Ensor Side-notched, one Kent Stemmed, two Palmillas Corner-notched, four Gary Stemmed, and a large fluted point that may be a variant of Tortugas Triangular.[89]

Tm c 300

This site, only about fifty feet in diameter, is situated north of Gonzalez on the south side of the arroyo below the hill leading to the barred gate of the Acuna Ranch in the southern Sierra de Tamaulipas. The one Tortugas Triangular, one Abasolo Round-base, and one Gary Stemmed[90] indicate that this small site is probably a component of the Almagre Phase.

Tm c 321

This site is situated north of Laguna del Sapo in an arbor. It is possibly a small open camp of the Almagre Phase. Two Ensor Side-notched, one Tortugas Triangular, one Gary Stemmed, one Catan Round-base, and one Armadillo Stemmed were given to us.[91]

Tm c 339

This is a large open site (three hundred yards in diameter) just east of the main spring in the Almagre Ranch in the southern Sierra de Tamaulipas. Though chips and wattle-and-daub abounded, only six blade fragments, two Gary Stemmed points and one Tortugas Triangular point[92] were collected. It is an Almagre Phase site.

Tm r 262

This ruin is just southwest of the Sierra de Tamaulipas, about one mile north of the village of Quintero. There is one large stone-faced mound about twelve feet high and at least two circular house-platforms. Large slabs in the field and along its edge indicate that at one time there were many more. Refuse appeared over an area about three hundred yards in diameter. Our collections from this site are almost entirely sherds, consisting of eight Eslabones Red, forty-one Pueblito Plain, seven Pueblito Brushed, three La Salta Black, and one La Salta Polished.[93] This complex of ceramics, plus the fact that one of the Pueblito Plain has a basal ridge and another a large solid conical foot, indicates that this site belongs to the Laguna Phase.

Tm r 88

This site is situated about four miles west of the town of Eslabones, just south of the Yucate and Eslabones Canyons. The ruin is on top of the mountain (Cerro Refugio) and relatively free of vegetation. It consists of about fifty round boulder house-platforms without stairs, and three stone pyramids. The latter are situated in the western portion of this plateau and appear to be the southern edge of a rectangular plaza. The site was explored in 1946.

Since the vegetation was not thick, it was possible to obtain an adequate sample of sherds from a surface collection. Sherds numbering 380 and 2 whole pots were collected. Of these sherds, 39 (10 per cent) were La Salta Polished, 53 (14 per cent) were Pueblito Plain, 85 (22 per cent) were La Salta Black, 90 (24 per cent) were Pueblito Brushed, and 115 (30 per cent) were Eslabones Red.[94] Only two large solid conical feet occurred. The two whole pots were Eslabones Red. These flaring-sided carinated bowls were found together, inside one house-platform. One was set into the floor right-side up, while the other was inverted directly on top of the first. Inside the pot was a single jadeite spherical bead. While we were excavating the pots, my workers, local inhabitants of the area, all maintained that usually bundle burials are found inside them. However, we did not find any.

Other objects found at the ruin included two blades, two angled-back metates, four roller manos, and three projectile points. One point belonged to Ensor Side-notched type, another was Morhiss Stemmed, and the

[86] *See* pp. 62–67.
[87] *See* p. 64.
[88] *See* pp. 62–65.
[89] *See* pp. 64–67.
[90] *See* pp. 62–65.
[91] *See* pp. 64–69.
[92] *See* pp. 64–65.
[93] *See* pp. 114–116.
[94] *See* pp. 114–116.

final one was the base of Gary Stemmed type.[95] Two percussion flaked blades occurred—one large and triangular, and the other ovoid—as well as a badly-worn hand-modelled figurine head with a turban.[96]

All the above features justify placing this site in the Laguna Phase.

Tm r 172

This ruin (Laguna Ruin) is situated on the Cuesta Llera, about one mile north of the Pan-American Highway at kilometer marker 599. It contains three large, badly eroded or disturbed pyramids around a roughly rectangular plaza. Surrounding the pyramids (but mainly north and east of them) are about one hundred circular, stone house-platforms made from boulders. There also is a hollow depression north of the ruins in which water was standing.

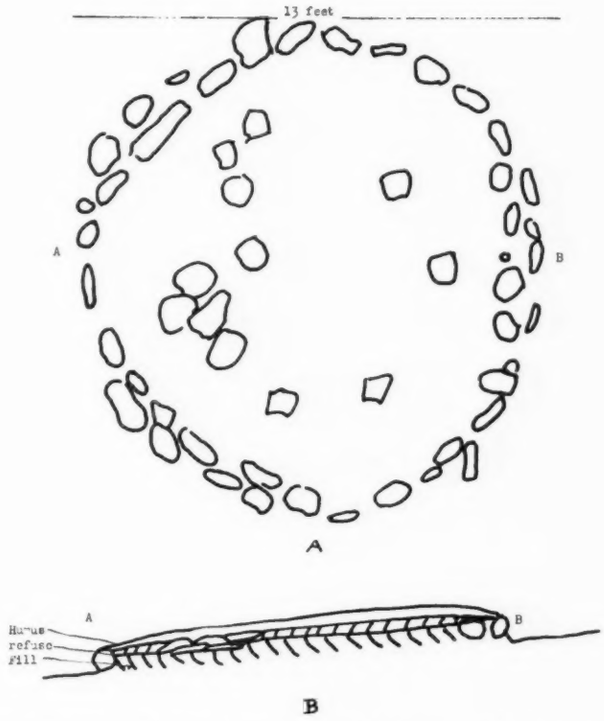
In the hope of getting some sort of stratigraphy, we dug three five-foot-square test holes and cleaned off one house-platform. Though the three test holes were productive, they revealed only about a one-foot depth of refuse and gave no indications of any clear-cut stratigraphy. The house-platform, about thirteen feet in diameter and about one foot high, contained a few sherds about three inches below the surface on a burned floor, on which lay a few flat slabs and the odd piece of wattle-and-daub. Inside the house below the floor was about six inches of brownish black dirt with a dozen sherds in it. Below this was sterile brown clay. Since there was no stratigraphy in any of the trenches, I have listed the materials found as a single group and have included a few of the more important objects found in the surface collection.

Analysis has revealed that this site is typical of the earliest ceramic remains found (so far) in the Sierra de Tamaulipas. This site is therefore considered to be the most important component of the Laguna Phase discovered. The traits are listed in table 1.

Tm r 301

This site is just inside the south gate of the Acuna Ranch in the central Sierra de Tamaulipas. It is located on a hilltop plateau and consists of about twenty circular platforms of boulders about thirty feet in diameter and one foot high, without steps. It is of the Laguna Phase since we found the following: 23 Eslabones Red sherds, 147 Pueblito Plain, 87 Pueblito Brushed, 2 La Salta Black, and 10 La Salta Polished sherds,[97] 4 molcajetes with large solid conical feet, a crude hand-modelled figurine, a small effigy cup, a bell-shaped pestle, one Armadillo Stemmed point, one Gary Stemmed point, one Palmillas Corner-notched point,[98] a roller mano, and numerous angled-back metates.[99]

[95] *See* p. 65.
[96] *See* pp. 123–127.
[97] *See* pp. 114–116.
[98] *See* pp. 65–69.
[99] *See* p. 92.



B

FIG. 21. A. Ground plan of a boulder house-platform at Tm r 172. B. Cross-section of boulder house-platform at Tm r 172 from A to B.

Tm r 187

This is located in a deep valley surrounded by mountains, about fifteen miles south of Ciudad Victoria. Over the valley about three hundred house-mounds are distributed and in one area six pyramids form a plaza. Our excavations were almost entirely on top of a small terraced hill south of the ranch, called San Antonio de las Ruinas. In one plaza area, about one hundred yards square, three pits were sunk about fifty yards apart, and masses of pots with bundle burials inside or under them were encountered. Above these burials we found fourteen Eslabones Red sherds, sixty-seven Pueblito Plain, twenty-four Pueblito Brushed (one having a small solid conical foot), one La Salta Black, and seven La Salta Polished.[100] On the basis of these finds, we have classified Tm r 187 as being of the Laguna Phase.

Tm r 302

This ruin is situated in a valley just east of San Antonio Nogalar Ranch in the southern Sierra de Tamaulipas. It covers an area about a mile long by one-quarter mile wide and has an acre-large plaza area surrounded by seven circular pyramids, about ten feet high, with wide steps leading to their summits. As much of the valley is covered by brush, we could see only about

[100] *See* pp. 114–116.

TABLE 1

FREQUENCY OF ARTIFACT TYPES OF THE LAGUNA RUIN (Tm r 172)

(See Chapter III for artifact type descriptions)

Projectile Points:		
A. Gary Stemmed		3
B. Ensor Side-notched		2
C. Morhiss Stemmed		4
D. Palmillas Corner-notched		2
E. Catan		2
F. Matamoros		1
G. Abasolo		2
Scrapers:		
A. Thin flake side-scrapers		3
B. Rectangular lamellar flakes		4
C. Crude lamellar flakes		1
Blades:		
A. Ovoid blades		6
B. Fine ovoid blades		1
C. Triangular blades		2
Ground and Pecked Stone Tools:		
A. Celts		3
B. Hammerstones		2
C. Bell-shaped pestles		2
D. Mortars		4
E. Roller manos		4
F. Angled-back metates		8
G. Bark beaters		2
H. Rectangular manos		2
Other Clay Objects:		
A. Clay bead		1
B. Clay disks		5
C. Ladles		3
Figurines:		
A. Panuco Type A		4
B. Panuco Bulging Eye		3
C. Panuco Coffee-bean Eye		1
Pottery:		
LAGUNA BROWN TOTAL		49
VESSEL FORM—ollas	rim profile 34 of fig. 37	3
	rim profile 35 of fig. 37	5
	rim profile 36 of fig. 37	6
	rim profile 37 of fig. 37	1
LAGUNA FINE ORANGE TOTAL		73
VESSEL FORM—basal-ridged bowls	rim profile 21 of fig. 37	2
Vertical recurved-sided bowls	rim profile 33 of fig. 37	1
Incurved rim bowl	rim profile 22 of fig. 37	1
Straight-sided out-sloping carinated bowls	rim profile 5 of fig. 37	1
Outflaring-sided carinated bowls	rim profile 8 of fig. 37	1
LAGUNA FINE CREAM TOTAL		203
VESSEL FORM—basal-ridged bowls	rim profile 19 of fig. 37	6
Thickened-lip bowls	rim profile 1 of fig. 37	2
	rim profile 16a of fig. 37	2
Vertical recurved-sided bowls	rim profile 17 of fig. 37	3
Incurved-rim bowls	rim profile 23 of fig. 37	2
Straight-sided outsloping carinated bowls	rim profile 4 of fig. 37	3
Outflaring-sided carinated bowls	rim profile 12 of fig. 37	2
	rim profile 15 of fig. 37	1

TABLE 1—*Continued*

ESLABONES RED TOTAL		517
DECORATION—incising on interior bottoms of bowls		
Parallel lines		17
Parallel lines at oblique angles to parallel lines		9
Parallel lines at right angles to parallel lines		7
Chevrons		2
VESSEL FORM—basal-ridged bowls	rim profile 18 of fig. 37	3
	rim profile 19 of fig. 37	4
	rim profile 20 of fig. 37	1
	rim profile 21 of fig. 37	1
Vertical recurved-sided bowls	rim profile 17 of fig. 37	2
Incurved-rim bowls	rim profile 22 of fig. 37	2
Straight-sided outsloping carinated bowls	rim profile 2 of fig. 37	1
	rim profile 15 of fig. 37	1
Outflared-sided carinated bowls	rim profile 12 of fig. 37	2
	rim profile 15 of fig. 37	4
	rim profile 16 of fig. 37	4
Ollas	rim profile 34 of fig. 37	7
	rim profile 35 of fig. 37	6
	rim profile 36 of fig. 37	17
	rim profile 37 of fig. 37	8
VESSEL FEET—large conical and solid		11
LA SALTA BLACK TOTAL		31
VESSEL FORM—incurved-rim bowls—rim profile 22 of fig. 37		1
Straight-sided outsloping carinated bowls—rim profile 2 of fig. 37		1
	rim profile 3 of fig. 37	1
PUEBLITO BRUSHED TOTAL		402
DECORATION(?)—Brushed vertically		338
Brushed horizontally		64
VESSEL FORM		
Straight-sided outsloping carinated bowls	rim profile 2 of fig. 37	9
	rim profile 3 of fig. 37	7
	rim profile 5 of fig. 37	2
	rim profile 6 of fig. 37	3
	rim profile 10 of fig. 37	3
Ollas	rim profile 29 of fig. 37	8
	rim profile 37 of fig. 37	2
	rim profile 38 of fig. 37	2
PUEBLITO PLAIN TOTAL		208
VESSEL FORM—Vertical recurved-sided bowls	rim profile 17 of fig. 37	11
	rim profile 29 of fig. 37	8
Thickened lip bowl	rim profile 18 of fig. 37	2
Effigy		2
APPENDAGES—vessel feet—large, conical and solid		7
LA SALTA POLISHED TOTAL		69
DECORATION—incising or interior bottoms of bowls		
Parallel lines		4
Parallel lines at right angles to parallel lines		2
Parallel lines at oblique angles to parallel lines		3
VESSEL FORM—Vertical recurved-sided bowls	rim profile 17 of fig. 37	1
	rim profile 29 of fig. 37	3
APPENDAGES—Vessel feet—large, conical and solid		9

thirty-five house-platforms, though I would estimate that probably at least one hundred exist. The platforms showed a considerable range of forms, though most are about thirty feet in diameter and one foot high. Some have vertical masonry walls with or without steps, while others have boulder walls with or without steps. Grave-diggers said that refuse was five feet deep in the cemetery, and our test trench revealed refuse two feet deep. I suspect there may be stratigraphy in this site, though our surface collection and testing revealed only Laguna Phase remains. These consisted of fifty-eight Eslabones Red sherds, eighty-four Pueblito Plain, ninety-four

Pueblito Brushed, ten La Salta Black, five La Salta Polished, two Laguna Fine Cream, and one Laguna Orange,[101] as well as a Panuco Type A figurine head,[102] a hollow figurine body, an Ensor Side-notched point,[103] and four large solid conical feet of molcajetes.

Tm c 328

Cueva de las Pilas is in the southern Sierra de Tamaulipas, a few miles north of Almagre. Archaeological deposits look to be fairly thick, but we found only evidence of a Laguna occupation. Four Eslabones Red and five Pueblito Plain sherds,[104] an ovoid quarry blank, and a finely-chipped square-polled celt were collected.

Tm c 338

In the ploughed field on the high terrace, just west of Cave Tm c 314, along the upper side of Canyon Calabaza and east of Almagre in the southern Sierra de Tamaulipas, sherds and chips were scattered over an area four hundred yards long and one hundred fifty yards wide. Though most of the sherds were badly worn, nine could be identified as Eslabones Red, one as La Salta Polished, and eight as Los Angeles Brushed.[105] There seems to have been both a Laguna and Los Angeles occupation on this terrace.

Tm r 185

These ruins are located at the top of the pass south of Ciudad Victoria on the road to Jaumave. They consist of nine platforms on top of a steep hill. All the house-platforms were without steps, and their walls were made of boulders. We picked up about twenty sherds, too worn to identify, and five Eslabones Red sherds.[106] It is probable that this site belongs to the Laguna Phase.

Tm r 223

This site is on the east side of the Pan-American Highway one kilometer north of Road-marker 604. Sherds were spread over about half a mile by a quarter of a mile area, and six rather large mounds formed a plaza. The site is actually in a broad flat valley just west of the Sierra de Tamaulipas. One of the ranchers informed us that before ploughing there had been numerous circles of stone (house-platforms?). Our collections consisted of four Eslabones Red sherds, eleven Pueblito Plain, ten Pueblito Brushed, six La Salta Black, seven La Salta Polished, one Laguna Fine Cream sherd,[107] two Type C figurines,[108] and two cylindrical clay tubes. It is most likely a Laguna Phase site.

Tm r 194

This ruin is situated just west of the Pan-American Highway on Cuesta Llera at Marker 698. It has a plaza surrounded by four pyramids, and just west of the plaza area we counted about forty house-platforms without steps. Artifacts belong to the Laguna Phase. We collected two ovoid bifacial blades, one Palmillas Corner-notched and Catan point,[109] seventeen Eslabones Red sherds, twenty-one Pueblito Plain sherds, four Pueblito Brushed, two La Salta Black, seven La Salta Polished sherds, eleven Laguna Brown sherds, ten Laguna Fine Cream sherds, and eight Laguna Fine Orange sherds,[110] and four fragments of angled-back metates.[111]

Tm c 337

On the bank of Canyon Calabaza north of Tm c 314, east of Rancho Almagre, in the southern Sierra de Tamaulipas, sherds and house-platforms occurred in a field about one-quarter mile square. All but one of the house-platforms had been disturbed by ploughing; this remaining one was about twenty feet in diameter and one foot high with masonry walls and steps. Identifiable sherds consisted of four La Salta Black, five Eslabones Red, and one nubbin foot of Pueblito Plain.[112] It seems to be an Eslabones occupation.

Tm r 195

Just east of the Pan-American Highway at Kilometer 596, an arroyo flowing down from the Cuesta Llera cuts through an ancient village area. The area bearing artifactual material is about one-quarter mile in diameter. No house-platforms were discernible, though water erosion had exposed at least ten burned floor areas of wattle-and-daub houses. Here on the remnants of three pyramids around a plaza, local collectors have gathered tremendous amounts of material, but we collected only nine Eslabones Red sherds, four Pueblito Plain sherds, twenty-seven Pueblito Brushed sherds, two La Salta Black sherds, two La Salta Polished sherds, two Laguna Fine Cream sherds, two Laguna Fine Orange sherds,[113] a Panuco Type C figurine,[114] two Morhiss Stemmed projectile points, two Armadillo Stemmed projectile points, one Matamoros Triangular projectile point, one Ensor Side-notched projectile point, one Tortugas Triangular projectile point, one

[101] *See* pp. 113–116.
[102] *See* pp. 122–128.
[103] *See* p. 67.
[104] *See* pp. 114–115.
[105] *See* pp. 114–120.
[106] *See* p. 114.
[107] *See* pp. 113–116.
[108] *See* pp. 122–128.
[109] *See* pp. 67–69.
[110] *See* pp. 114–116.
[111] *See* p. 92.
[112] *See* pp. 114–116.
[113] *See* pp. 114–116.
[114] *See* pp. 122–128.

Abasolo Round-base projectile point, four point tips,[115] one square-base blade, and four crude choppers. These artifacts indicate that this site must be considered a component of the Laguna Phase.

Tm r 310

This is a relatively large ruin on top of a mountain named Tres Horas about eight miles west of Rancho Olivo in the southeastern Sierra de Tamaulipas. It has a large plaza of about two acres surrounded by seven large pyramids, the largest one of which is about thirty feet high and is on the north side of the plaza. Surrounding the plaza and extending down the mountain slope a short distance are from fifty to one hundred masonry house-platforms with steps on artificially-constructed terraces. Many of the sherds found were badly worn and not identifiable as to type. However, the 53 Eslabones Red, 25 La Salta Black, thirty La Salta Polished, 199 Pueblito Plain, 171 Pueblito Brushed, and 2 Laguna Fine Cream sherds, as well as a large solid conical molcajete foot, indicate that it is a component of the Laguna Phase.[116]

Tm r 324

This ruin, one of two called Pueblito, is situated about two miles east of Almagre, in the southern Sierra de Tamaulipas. It is just above the Canyon Calabaza, and precipitous slopes border three sides of the ruin. About three hundred masonry house-platforms with steps are scattered over an area one-half mile long and one-quarter mile wide. In the northeast section of the ruin there is a plaza area with four circular pyramids on its south edge and three circular pyramids and a rectangular pyramid along its north border. Most of them are about ten to twenty feet in elevation. In the southwest section of the ruin there are two low rectangular pyramids, which are parallel to each other and only about fifteen feet apart. This may have been a ball court.

Identifiable sherds, numbering 774, were collected on the surface. These consisted of 114 Eslabones Red, 436 Pueblito Plain, 176 Pueblito Brushed, seventeen La Salta Black, 29 La Salta Polished, and 2 Laguna Cream sherds.[117] This complex of sherd types, plus the occurrence of a large proportion of large conical solid vessel feet associated with solid and hollow ones, plus various vessel forms, indicated that the Pueblito site is probably of Late Laguna times.

Other artifacts consisted of angled-back metates, mortars, rectangular manos, cylindrical manos, and bell-shaped pestles,[118] one clay ladle,[119] a Coffee Bean-eye type figurine,[120] one finely-chipped ovoid knife, thirteen ovoid knives or quarry blanks, four side-scrapers, eleven point fragments, three Abasolo Round-base points, three Tortugas Triangular points, four Palmillas Corner-notched points, one Kent point, one Ensor Side-notched point, one Armadillo Stemmed, one Catan Round-base, and one Matamoros Triangular point.[121]

Peter Pratt (the discoverer of the site) and I both thought that somewhere in the site there might be some stratigraphy of Eslabones over Laguna remains. However, as observation of holes and erosional cuts nowhere revealed any great depth of refuse, we decided not to dig.

Tm r 90

This ruin (Monte Nudo) is situated on a rocky barren hill about three miles east of Pueblito, at the junction of the trail from Pueblito to Eslabones and Pueblito to Tripones. The hill, which is almost without vegetation, appeared to have undergone considerable erosion. The ruin consists of about twelve round stone house-platforms with walls of masonry. Although the sherds, like the ruin, had undergone considerable erosion, a surface collection was made. The thirty-seven sherds collected appear to be plain ware (polishing or red paint may have been eroded), one of which had a large hollow conical foot, four appeared to be brushed ware, forty-two appeared to be polished plain, and one was polished black ware. It is a component of the La Salta Phase.

Tm r 186

About fifteen miles south of Ciudad Victoria, on the hill just west of Rancho San Antonio de las Ruinas, are about thirty round house-platforms with steps. As, unfortunately, they were covered with heavy brush, our artifact-collecting was not very successful, but we did find four Eslabones Red sherds, two Pueblito Plain sherds, and two Pueblito Brushed sherds.[122] These suggest that this was a Laguna occupation.

Tm r 188

This is a small ruin about fifteen miles southwest of Ciudad Victoria, east of the Juamave Road. It is on the top of the mountain just south of Joya Verde Ranch and consists of four round house-platforms. As it was heavily covered with brush, we were able to find only three Eslabones Red sherds on the surface. These suggest a Laguna Phase occupation.[123]

Tm r 196

On the south side of the Cuesta Llera, just east of the Pan-American Highway as it starts down the slope,

[115] *See* pp. 62–69.
[116] *See* pp. 114–116.
[117] *See* pp. 114–116.
[118] *See* p. 93.
[119] *See* pp. 128–130.
[120] *See* pp. 122–127.
[121] *See* pp. 62–69.
[122] *See* pp. 114–116.
[123] *See* pp. 111–112.

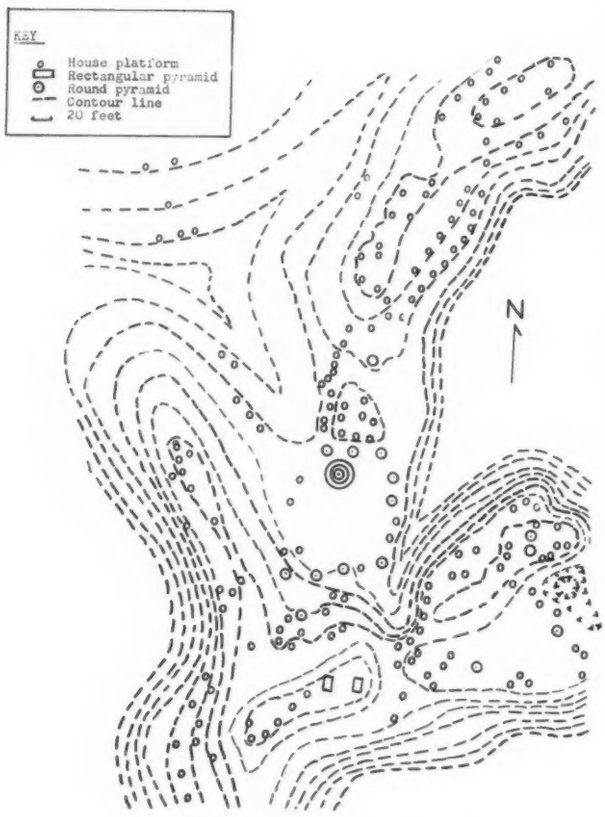


FIG. 22. Sketch of Pueblito (Tm r 6).

were three round house-platforms and about an acre of ploughed ground covered with chips and ceramics. Like the other sites in the immediate area, it seems to have been a Laguna occupation. Most of the sherds collected were too badly worn to be identified as to type, but we were able to recognize six Eslabones Red sherds, ten Pueblito Plain sherds, ten Pueblito Brushed, two La Salta Black, one La Salta Polished, and one Laguna Fine Cream.[124] Right at the edge of the road, we also picked up a Palmillas Corner-notched point.[125]

Tm r 6

This ruin, called, like one previously cited, Pueblito, is probably the best known archaeological site in Tamaulipas. The inhabitants of the area spoke of it numerous times, and J. Meade has published a map of it but has incorrectly classified it as Huastec.[126] I visited it in 1945, 1946, and 1954.

The site is situated on the hills just east of the Canyon Diablo, about halfway between the towns of Los Angeles and Eslabones. The ruin is strewn along the tops and sides of four large hills. It is composed of about two hundred round masonry house-platforms (usually without stairs), which form no regular pattern, terraces outlined by stone walls, a large depression or *tanque*; three rectangular pyramids along the south border of the ruin, and a rectangular plaza flanked by ten small round or rectangular pyramids on the east, north, and south, and with a large pyramid in the north part of the plaza (fig. 13). Unlike the other sites it was clear of vegetation and had undergone a good deal of erosion.

The profiles of five pits dug by amateurs were examined, and four more were excavated by my party. It appeared that the refuse was not deep, and the materials were sparse. Fortunately the cleared ground allowed for extensive surface collections. The following artifacts were collected on the surface (table 2).

From my four excavations 3,222 sherds were uncovered, 745 (23 per cent) of which were La Salta Polished, 842 (26 per cent) were Pueblito Plain, 517 (17 per cent) were La Salta Black, 908 (28 per cent) were Pueblito Brushed, and 210 (7 per cent) were Eslabones

TABLE 2

FREQUENCY OF ARTIFACT TYPES AT THE PUEBLITO RUIN (Tm r 6)

(See Chapter III for artifact type descriptions)

Projectile Points:	
A. Morhiss Stemmed	5
B. Palmillas Corner-notched	3
C. Ensor Side-notched	1
D. Aberrant Bifurcated base	1
E. Catan	1
F. Matamoros	1
Scrapers:	
A. Thin flake side-scrapers	12
B. Rectangular lamellar flake	1
Blades:	
A. Crude Ovoid blades	4
B. Fine Triangular blade	1
C. Fine Ovoid blades	2
Ground and Pecked Stone Tools:	
A. Celt	1
B. Hammerstones	many
C. Bell-shaped pestles	2
D. Mortars	many
E. Roller manos	many
F. Angled-back metates	many
Other Clay Objects:	
A. Pierced disks	1
B. Unpierced disks	6
C. Ladles	6
D. Rattle	1
E. Flute	1
F. Bead	1
Figurines:	
A. Portrait Type	1
B. Mould-made Types	8
C. Modelled Types	3

[124] *See* pp. 113–116.
[125] *See* p. 67.
[126] J. Meade, 1940.

Red. Vessel feet from the surface and my excavation had the following distribution: 35 large hollow conical feet, 14 small solid conical feet, and 17 large solid conical feet.[127] These sherd frequencies and other features justify placing this ruin in the late part of the Eslabones Phase.

Tm r 304

This large ruin, four miles north of Rancho Acuna, called Laguna de Moctezuma, is in the centre of the Sierra de Tamaulipas. There are more than one thousand house-platforms spread over the top of a star-shaped hill. These are about twenty-five feet in diameter and three feet high, and have vertical masonry walls and steps leading to their summits. Just west of the centre of the ruin, in a saddle in the hill, is a plaza surrounded by circular pyramids about fifteen feet high. Erosion on some of them revealed a red-painted plastered veneer on their sides and steps. Their tops were covered by wattle-and-daub, the remnants of fairly large (forty feet by twenty feet) temples that surmounted them. However, perhaps the most interesting features were in the eastern part of the ruin. To the northeast was a fairly large lake, which showed definite evidence of aboriginal damming, while in the southeast was a ball court.

As, unfortunately, the site was grass-covered and our stay was brief, our collection of artifacts was not large. However, they seem to show that it is of the Eslabones Phase. The artifacts consisted of eight Eslabones Red sherds, seventy-eight Pueblito Plain, fifty-eight Pueblito Brushed, thirty-four La Salta Black, and forty-three La Salta Polished sherds.[128] One of the Pueblito Polished had solid nubbin feet. Also, a small Gary Stemmed point occurred.[129]

Tm c 311a

This site was first visited in 1954, but as its materials became mixed, I revisited it in 1955. It is five and one-half miles west of La Coma Ranch in the southeast Sierra de Tamaulipas on a mountain top, which had a dried-up lake on its summit. One large rectangular pyramid was observed, but dense vegetation covered the rest of the site. I believe this site to be a large one. Thirty-six Pueblito Brushed, fifteen Pueblito Plain (one with a nubbin foot), thirteen La Salta Black, seven La Salta Polished, and four Eslabones Red sherds,[130] two ovoid blade fragments, one bell-shaped pestle, and two large cylindrical mortars[131] indicate that it is of the Eslabones Phase.

[127] *See* p. 110.
[128] *See* pp. 114–116.
[129] *See* p. 65.
[130] *See* pp. 114–116.
[131] *See* p. 91.

Tm r 78

This ruin (Los Tanques) is situated between Canyon Cazuela and the Canyon Escondon. It is about three miles east of Piedras Negras and six miles north of Los Angeles. The ruin is on top of a long hill running northeast to southeast and has as distinctive features two large depressions called *tanques*. Structures are not numerous (about forty) and are situated between the two tanques and north of them. The whole ruin is covered by leaves and small trees.

The house-platforms are round masonry-walled structures usually having steps. There also occurred five rectangular pyramids (ten feet high, forty feet long, and thirteen feet wide) made of slabs of rock, now uprooted by vegetational growth. On the shorter side of two of these pyramids were broad staircases which were flanked by walls. Another type of structure was noted at this site. It resembles the so-called *caracol* structure of the Maya. The core is about five to six feet high and is encompassed by a vertical slab-masonry wall. In this respect it resembles the house-platforms. Leading up to the flat top of the structure are two staircases, the entries to which are on opposite sides. These staircases wind parallel to the walls, each executing a half-spiral.

As leaves covered the ground and made the surface-collecting of artifacts impossible, two excavations were undertaken at this ruin. However, a secondary purpose of excavation was to determine the function of these round masonry-walled structures. Were these structures originally the walls of round houses, the centres of which have since become filled with dirt and parts of the walls; or were they round masonry walls that were filled by their builders to serve as platforms for house structures on their surfaces? To solve this problem two structures were selected for excavation. House No. I was a large structure with walls three feet high and steps leading to its summit, while the other, House No. II, proved to be a small structure with walls about one foot high and without steps. These two were chosen as they appeared to be polar types of the range of kinds of houses that were observed. In both houses a trench three feet wide and fifteen feet long was excavated from the surface of the house down into three inches of the basic caliche-filled soil.

House No. I revealed the following facts:

1. That the walls of the structure were placed on the basic caliche soil and that no refuse on occupational level was associated with the lower levels of the house.

2. That inside the walls the portion from the caliche to the level of the top of the walls was filled with huge rocks (too large and irregular to have been parts of the wall or any room construction), pieces of caliche, and very small amounts of refuse, and almost no sherds or artifacts.

3. That in the layer on the top of the structure, which

was level with or above the walls, were found 99 per cent of all the sherds and artifacts, as well as pieces of charcoal and wattle-and-daub.

The excavation of House No. II revealed much the same facts, which may be summarized as follows:

1. The walls were placed upon the basic caliche.
2. Above the subsoil to the level of the top of the walls were to be found refuse in small amounts and chunks of caliche. This zone contained no charcoal, no wattle-and-daub, no floors.
3. That level at the top of the walls and above contained the greatest concentration of sherds and wattle-and-daub. Three fire-blackened slabs lying horizontal, and on a level with the top of the walls, were also found in one place.

From the above set of facts I have concluded that these round-walled masonry structures represented house-platforms, since the centres are filled with materials that could not possibly be the debris from walls or roofs, and since wattle-and-daub (the remnants of house walls) and refuse were found only at the top of these structures, an indication that the tops served as house floors.

In the excavation of the two houses only 789 sherds were found, only 160 of which were found in House No. II. The limited number of sherds at House No. II is very definitely an inadequate sample. However, as percentages of types were very similar in the two houses, I believe them to be of the same period. The percentages of the types and the four hollow molcajete feet found seem to justify the inclusion of all the sherds into the La Salta Phase. The tables in the pottery section display graphically the justifications for this assignment.[132]

Tm r 80

This ruin, called Cazuela, which is located in the Canyon Cazuela between ruins Tm r 78 and Tm r 79, is composed of about four round stone house-platforms with a stone-wall terrace connecting them.

Only six body sherds were found, four were polished ware and two were brushed ware.[133] It is probably of the La Salta Phase.

Tm c 289

On the south edge of Arroyo Maguey, just east of Los Angeles, in the northern Sierra de Tamaulipas, Peter Grant collected one Pueblito Plain sherd and four La Salta Polished with engraving on it, as well as two large point fragments.[134] This site seems to have been a small camp of the La Salta Phase peoples.

[132] *See* pp. 110–112.
[133] *See* pp. 114–116.
[134] *See* pp. 114–116.

Tm c 322

This large open site, covering one and one-half acres, is situated on top of a horseshoe-shaped hill near Rancho Las Lacas, in the southeast Sierra de Tamaulipas. No stone structures were observed, but the 143 Pueblito Plain, 136 Pueblito Brushed, 97 La Salta Polished (one of which is a hollow molcajete foot), the 5 Eslabones Red and 4 La Salta Black sherds indicate that it belongs to the La Salta Phase.[135] Also collected were one Tortugas Triangular point, one Abasolo Round-base point,[136] and one bell-shaped pestle.[137] Fragments of angled-back metates were observed on the surface.[138]

Tm r 323

The ruins are located on Rancho La Toracilla, about four and one-half miles west northwest of Almagre, in the southern Sierra de Tamaulipas. The site is situated along the slopes of a small hill, and about one hundred fifty house-platforms are scattered over an area about one and one-half miles by one-quarter mile.

According to Peter Pratt there are three parallel rows or lines of house-platforms following the contours of the east side of the hill above an arroyo with a single large structure (pyramid?) on the top of the hill. The houses are circular in outline and have vertical masonry walls; steps lead to their summits. They average about one foot high and thirty feet in diameter.

Most of the artifacts were collected from a ploughed field within the ruin. The pottery consisted of 173 Pueblito Plain, 138 Pueblito Brushed, 78 La Salta Polished (3 of which are engraved), 58 La Salta Black, 17 Eslabones Red, 4 Los Angeles Brushed, and 3 aberrant sherds.[139] This combination of pottery types, as well as the predominance of hollow and nubbin molcajete feet, the vessel forms, and a small fragment of a mold-made figurine head, indicates that Tm r 323 belongs to the La Salta Phase. Other artifacts include two crude ovoid blades, one crude square-based blade, seven crude point fragments, two Palmillas Corner-notched points, two Ensor Side-notched points, one Catan Round-base point, one Abasolo Round-base and one aberrant Tortugas Triangular point with a deep V-shaped base.[140] Peter Grant informed me that angled-back metates, mortars, and cylindrical manos or pestles occurred in the field, but their amounts were not recorded.[141]

Tm c 220

This rock shelter is on the west side of Canyon Pinal, about four miles above its junction with the Canyon

[135] *See* pp. 114–116.
[136] *See* pp. 62–64.
[137] *See* p. 93.
[138] *See* p. 92.
[139] *See* pp. 114–116.
[140] *See* pp. 62–68.
[141] *See* pp. 91–92.

Diablo. Since its floor is about forty feet above the arroyo bed and even with the top of the high terrace, and since the cave is sixty feet wide by fifteen feet deep, we planned to test it in 1955. Unfortunately time did not allow us to do so. The surface yielded four Abasolo points,[142] two disc scrapers, a gouge,[143] and four Pueblito Plain, four Los Angeles Brushed, three Los Angeles Smooth sherds,[144] and three flake side-scrapers. A small test pit three feet by two feet and one foot deep revealed two charcoal strata, three inches thick, with six-inch-thick layers of grey ash and sand between them. Both these occupational layers had Los Angeles Phase tools.[145] The top layer had six Los Angeles Brushed and one Los Angeles Plain sherd, while the lower charcoal stratum contained two Los Angeles Brushed sherds.

Tm c 84

This is a long narrow rock shelter on the west side of the Canyon Diablo, six kilometers south of where the Los Angeles–Eslabones trail crosses the arroyo. The back wall of the cave contains tally-type pictographs as well as a couple of red hands. As the sloping floor of the cave, only about thirty feet above the arroyo, had been washed clean, there were only a few artifacts on it. The artifacts included one Abasolo Round-base point, one Matamoros point,[146] one large plano-convex end-scraper, five Los Angeles Brushed sherds, one Los Angeles Plain sherd,[147] and two flake end-scrapers.

Tm c 85

This cave is situated on the east side of the Canyon Diablo about four miles south of where the Los Angeles–Eslabones trail leaves the canyon. The rock shelter is only about twenty feet above the canyon floor, above a fifteen-foot cliff and below a one hundred-foot cliff. I greatly suspect that any refuse deposits on the floor of the cave have been washed away by floods or gully-washers in the canyon. Only eight flint chips, a flake side-scraper, and one Matamoros Triangular point[148] were found in the cave. From this meagre evidence the only occupation would seem to have been by the Los Angeles peoples.

Of much greater interest than the artifacts are the pictographs on the back walls of the cave and on various boulders in the cave.

From a conjunctive standpoint, the inferences to be drawn from the artifacts and pictographs are very important. First of all, since the drawings in all the caves are covered by a filmy layer of limestone and the figures appear in many caves in a region far from white settlements, and since the style is so un-European, I think it fairly safe to conclude that the people who made the pictographs were aborigines (Indians). Secondly, since the figures depict men on horseback, it would be safe to conclude that these aborigines made the drawings during historic times. Furthermore, since the only aborigines known to be in this region in historic times were the Pasitas, it seems safe to conclude that the artists who made the pictographs were Pasitas. The single Matamoros Triangular projectile point in association with a picture of a bow suggests that this small triangular point was an arrowpoint of the Pasitas. Thus, it would appear that the Los Angeles Phase, which includes the diagnostic Matamoros Triangular projectile points, may be correlated with the historic Pasitas tribe.

Tm c 197

This is a small open site on the mesa just above Cave Tm c 81. My workmen collected a whole pot of Los Angeles Brushed, six Los Angeles Black sherds, and four Los Angeles Plain sherds[149] (as well as a heavy rectangular metate which we left in the arroyo just below Tm c 81).

Tm c 198

Tm c 198 is in a cornfield just east of the ruins of the early mission south of the present village of San Felipe de Los Angeles. There are no modern houses near it, nor have there been any in the memory of the oldest living inhabitant (in 1946) of Los Angeles, José Lerma. However, in the field were twenty-seven Spanish Glaze Ware sherds, fourteen Los Angeles Black, eleven Los Angeles Brushed, and ten Los Angeles Plain.[150] Unfortunately, a test hole revealed that any cultural strata that may have existed had become disturbed by ploughing. On the basis of documents in Villa Casas, written in the late eighteenth century, José Lerma believed this to be the site of the Pasitas, who lived in or adjacent to Los Angeles during the earliest Spanish occupation. For various reasons I was unable to see these documents, but I always found José Lerma to be an acute observer and a very reliable informant. Furthermore, this site seems to be the only one around Los Angeles, according to my own observations and those of the local inhabitants. The evidence is very suggestive that this is the early village of the Pasitas at Los Angeles and, furthermore, that the Pasitas had the kind of material culture that forms our Los Angeles Phase.

Tm c 221

This site is located on the second terrace on the west side of Canyon Pinal, four miles above its junction with

[142] *See* p. 62.
[143] *See* p. 79.
[144] *See* pp. 119–121.
[145] *See* p. 163.
[146] *See* pp. 62–68.
[147] *See* pp. 119–121.
[148] *See* p. 68.
[149] *See* pp. 119–121.
[150] *See* pp. 119–121.

the Canyon Diablo, in the northern Sierra de Tamaulipas. Chips, sherds, and burned clay and rock were scattered over an area about fifty yards wide and seventy-five yards long. As eleven Los Angeles Plain sherds occurred, it is a Los Angeles occupation.[151]

Tm c 222

The site is on the second terrace of the south side of the Canyon Pinal about two miles southwest of its junction with the Canyon Diablo, in the northern Sierra de Tamaulipas. Sherds (most of them badly worn) and chips extended over an area about two hundred yards long and one hundred yards wide. Identifiable artifacts consisted of one Los Angeles Concave point,[152] five Los Angeles Brushed, three Los Angeles Plain, one Los Angeles Black, and one glazed sherd.[153] This site was a small village of the Los Angeles Phase.

Tm c 288

This long (one hundred fifty feet), narrow (twenty feet wide) rock shelter is six miles east of Los Angeles, on the north side of Canyon de Maguey in the northern Sierra de Tamaulipas. One Los Angeles Plain, three Los Angeles Brushed, and nine glazed sherds [154] indicate a Los Angeles Phase occupation in it.

Tm c 290

This site, located at the eastern waterhole of the village of Los Angeles in the northern Sierra de Tamaulipas, slopes into Tm c 290a. It covers an area about five hundred yards long and one hundred yards wide. Identifiable artifacts, including ten Los Angeles Brushed sherds and one Los Angeles Plain sherd,[155] indicate a Los Angeles Phase occupation.

Tm c 292

This is a small cave in Canyon Yucate, two miles south of the junction of Canyon Yucate and the Eslabones–Los Angeles trail, in the eastern Sierra de Tamaulipas. The rock shelter is small, being only twenty feet wide and ten feet deep. Bar-and-dot pictographs appear on the wall of the cave and adjacent cliff. Eleven Los Angeles Brushed and seven Los Angeles Plain sherds attest to a Los Angeles occupation of the shelter.[156]

Tm c 294

This site is on the second terrace where the Los Angeles–Eslabones trail meets the Canyon Yucate in the eastern Sierra de Tamaulipas. Burned clay, chips and sherds are spread over an area about two hundred fifty feet by fifty feet. Most of the sherds were too worn to be identifiable as to type, though their paste suggests they are Los Angeles Ware. One Starr Concave point [157] and four Los Angeles Brushed sherds,[158] however, were recognizable and indicate that Tm c 294 was a Los Angeles Phase village.

Tm c 308

This small site, about one hundred feet in diameter, was found on the west bank of the arroyo east of Rancho Sabina Gordo near Aldama. Two small triangular endscrapers and a fragment of a Fresnos Triangular point,[159] as well as chipped flint, were collected. Although the site had no pottery, its scraper and projectile point suggest it is a component of the Los Angeles Phase.

Tm c 311

This site is just west of the waterhole at Rancho El Olivo in the southeast Sierra de Tamaulipas. It was first visited in 1954 when Pratt photographed some pictographs of the red hand, stick figure, and tally varieties. In 1955 I revisited it and picked up thirty-three Los Angeles Brushed, eighty-three Los Angeles Plain, six Los Angeles Black, two Zaquil Red, and twenty-four modern sherds.[160] These materials, indicative of a Los Angeles occupation, covered an area about one hundred fifty yards long and fifty yards wide, just west of the waterhole.

Tm c 312

This open site extends over a field four hundred yards square, about six hundred yards northwest of Rancho El Olivo in the southeast Sierra de Tamaulipas. As 104 Los Angeles Plain sherds, 20 Los Angeles Brushed, 9 Los Angeles Black, 2 Nogales Corrugated sherds,[161] a rectangular mano and a metate occurred, the occupation seems to have been mainly by Los Angeles Phase peoples. One of the projectile points was Armadillo Stemmed, while another was a crude example of Ensor Side-notched [162] and the other two were triangular.

Tm c 316

This small rock shelter is west of the arroyo west of Ejido de las Yuccas in the southeast Sierra de Tamaulipas. Sixty-eight Los Angeles Brushed sherds, eight Los Angeles Plain and one Los Angeles Black,[163] and

[151] *See* pp. 119–121.
[152] *See* p. 70.
[153] *See* pp. 119–121.
[154] *See* pp. 119–121.
[155] *See* pp. 119–121.
[156] *See* pp. 119–121.
[157] *See* p. 70.
[158] *See* pp. 119–121.
[159] *See* p. 69.
[160] *See* pp. 119–121.
[161] *See* pp. 119–121.
[162] *See* p. 67–69.
[163] *See* pp. 119–121.

a Starr Concave point indicate [164] that it is a component of the Los Angeles Phase.

Tm c 320

This cave is one mile north of Laguna del Sapo in the eastern Sierra de Tamaulipas. It is a small shelter about at the level of the arroyo bottom. The Los Angeles Brushed, Black, and Plain sherds,[165] as well as the small triangular point,[166] reveal that the occupation was mainly by Los Angeles peoples, though a chopper and two Eslabones Red Sherds occurred.

Tm c 325

This is a small open site just east of the road in the south part of the Almagre Ranch, in the southern Sierra de Tamaulipas. Chips were spread over an area about fifty yards in diameter, but because of vegetation and pine needles few artifacts were picked up. They consisted of two Los Angeles Brushed sherds [167] and an Armadillo-type projectile point.[168] These would suggest that the site was a temporary camp of the Los Angeles peoples.

Tm c 326

Cueva Metate (Tm c 326) is located about five miles north of Almagre, in the southern Sierra de Tamaulipas. It is a small cave with evidence of several short occupations. The artifacts consisted of thirty-one Los Angeles Brushed, ten Los Angeles Plain, eight Los Angeles Black, one Tancol Brown-on-Buff, and five unknown sherds,[169] as well as a fragment of a crude bifaced blade and a bell-shaped pestle. This complex of artifacts indicates that the occupations were by peoples of the Los Angeles Phase.

Tm c 327

Bat Cave is located just south of Santa Maria in the southern Sierra de Tamaulipas. There is evidence of several short occupations by peoples of the Los Angeles Phase. Artifacts consisted of fourteen Los Angeles Plain [170] and nine Los Angeles Brushed sherds,[171] a thin-edged limestone chopper,[172] and two corncobs of the Breve de Padilla race.[173]

Tm c 293

This large (three hundred feet long), narrow (thirteen feet wide), rock shelter is in the Canyon Yucate, about four miles above its junction with the Los Angeles–Eslabones trail in the eastern Sierra de Tamaulipas. Four Abasolo Round-base points, three Tortugas Triangular points, two Almagre Stemmed points, two Gary Stemmed points, one Ensor Side-notched point, one Fresnos Triangular point,[174] two Los Angeles Brushed sherds, one La Salta Black sherd,[175] and one skin smoother [176] indicate that it is probably a stratified site with Nogales, La Perra, Almagre, Los Angeles, and/or Eslabones and/or La Salta occupations.

III. DESCRIPTION OF ARTIFACTS

1. PROJECTILE POINTS

It is fitting that the artifact descriptions begin with projectile points because they clearly differentiate eight out of the nine cultural phases, and there is good stratigraphy of eighteen resident types. From the area we obtained 1,176 points or fragments thereof, 993 coming from excavations. Of these, 807 were typeable, and 666 of them came from excavation. In the description of projectile point types I have used the terminology recommended by Krieger in his *Introductory Handbook of Texas Archaeology*.[1]

In the analysis, the first requirement was to establish types. This was done by a series of comparisons. First, the projectile points of Tm c 81 were laid out according to layers. Next, the projectile points of each layer of Tm c 81 were separated into trial types on the basis of their form, size, and chipping technique. Then the trial types from the six layers of Tm c 81 were compared to see whether they had stratigraphic significance. From this analysis it became evident that there were several broad trial types that had temporal significance. Trial type I (which later became Tamaulipas Triangular, Aberrant Point 1) was confined to Layer 5. A second trial type (later called Lerma Double-pointed) was mainly in layers 4 and 5. A third trial type (which later became Abasolo Round-base, Nogales Triangular, and Tortugas Triangular) occurred in Layers 1 to 4, though it was mainly in Layer 3. A small side-notched point of obsidian (later found to be Teotihuacan Side-notched) occurred only in Layer 2. Accompanying it was a large corner-notched point, trial type 5 (later to become Palmillas Corner-notched). Trial type 6 (later called Ensor Side-notched) was in Layers 1 and 2. Trial type 7 (which later was split into Fresnos Triangular, Starr Concave, and Los Angeles Concave) occurred in Layer 1, as did three small notched points (Pasitas Side-notched and a Toyah point). Thus our preliminary sorting of Tm c 81 yielded eight trial types having stratigraphic significance.

[164] *See* p. 70.
[165] *See* pp. 119–120.
[166] *See* p. 70.
[167] *See* pp. 119–120.
[168] *See* p. 69.
[169] *See* pp. 119–121.
[170] *See* p. 119.
[171] *See* p. 119.
[172] *See* p. 85.
[173] *See* pp. 139–151.
[174] *See* pp. 62–70.
[175] *See* pp. 110–121.
[176] *See* p. 79.
[1] Suhm and Krieger, 1954.

Next, the projectile points of Tm c 174 were laid out by layers and compared. Trial types 1 and 2 again had good stratigraphic evidence, but it soon became apparent that the third and fourth trial types had to be divided into at least a round-based and two triangular varieties. The results of the layers of the two caves were then compared. Similarly the layers of each square of Tm c 82 were separated into trial types and compared with those from the two previous caves. Again it became apparent that the earlier ten trial types should be further separated on the basis of significant stratigraphic distribution. This comparison led to the recognition of seventeen trial types as well as eleven points that did not seem to fit too well into any of the types. This same process was then repeated with the levels from Tm c 83, Tm c 315, Tm c 314, Tm r 172, Tm r 6, Tm r 86, Tm r 88, and Tm r 79. Out of this mass of comparisons, it was apparent that there were seventeen types and twelve aberrant points that had significance in time.

Then began the comparison of these points, first with those from the stratigraphic excavations of the Sierra Madre of southwestern Tamaulipas and from the various other sites found in the survey of Tamaulipas. Such comparisons further confirmed the justification for our seventeen resident types, as many of them had significant spatial distributions. Finally, Dr. Krieger and I compared the projectile points of Texas with those from Tamaulipas. One of the Tamaulipas types, then called Brownsville Concave, was found to include two variants that had different spatial distributions in Texas. These became Fresnos Triangular and Starr Concave.

Thus it became possible to classify 807 of the projectile points found in the Sierra de Tamaulipas into eighteen types that have significance in time and space. This still left a residuum of twenty points that did not fit into any of the defined categories from Tamaulipas. I have called these aberrant points, and many of them may have been traded into the area from other regions. Although they do not aid in delineating the sequence in Tamaulipas, they may be of use in establishing extra-areal connections.

A few general statements can be made about the total sequence. Projectile points decrease in size from early to late. Unnotched and unstemmed precede large stemmed and notched ones, and these in turn precede small notched and unnotched types. This general sequence is in accord with other areas of North America where long sequences of projectile points have been found.

The earliest type of projectile point, which has a general laurel-leaf shape, is widespread in pre-ceramic horizons in the New World.[2] The data in Tamaulipas, in the Valley of Mexico,[3] and Coahuila suggest that Lerma Double-pointed is a very early type that endured into later horizons in some parts of North America. One cannot help wondering whether the similarly shaped points and their accompanying complexes from the earliest horizons of South America, namely, the El Jobo Complex of Venezuela,[4] the Shell Fishhook culture in northern Chile,[5] and the Huancayo Complex of Peru,[6] are related to those in Tamaulipas. As far as Tamaulipas is concerned, we cannot as yet connect this Lerma Phase projectile point type with those from later horizons.

The next types that appear in Tamaulipas are the Abasolo Round-base, Nogales Triangular, and Tortugas Triangular. Just what they are derived from is most difficult to say. Abasolo Round-base and Nogales Triangular have very general forms which can be duplicated in many horizons over a wide area. Tortugas Triangular, which is fairly rare in the Nogales Phase, but dominant in La Perra times, is a more distinctive type. It is extremely common in Tamaulipas and occurs with many pre-pottery complexes in Texas. It has been suggested by Gladwin and others that this point type with its concave base and basal flute may have been derived from the concepts involved in such Early Man types as Folsom, Clovis, and Plainview.[7] This hypothesis is as yet unproved, but certainly warrants further investigation. As far as Tamaulipas and southern Texas are concerned, this type seems to have a fairly long history. Occurring with these three early points in the slightly later La Perra horizon are a few points with incipient pointed stems. In a general way they are much like the Gypsum Cave point.[8] If the Carbon-14 dating of about 8,000 years ago is correct for Gypsum Cave points,[9] then the ones in Tamaulipas must be later derivatives, as they seem to occur between 4,000 and 5,000 years ago. This early stemmed type, as well as the Abasolo, Nogales, and Tortugas types, occurs with two other stemmed types, Gary and Kent points, during the Almagre Phase. Both the Gary and Kent types are widespread in Texas.[10] The Gary type also occurs over much of the United States and may be a good time-marker over a wide area. It, or a related type, also occurs in the earliest Formative Period of Mexico.[11] Also present for the first time in the Almagre horizon are two large notched types, namely, Palmillas Corner-notched and Ensor Side-notched.[12] These two types, along with Morhiss Stemmed,[13] occur with the Laguna, Eslabones, and La Salta Phases,

[2] Cressman, 1956. *See* Type 11.
[3] J. M. Cruxent and I. Rousse, 1956.
[4] Aveleyra, 1953.
[5] Bird, 1943.
[6] Tschopik, 1946.
[7] Krieger, 1947.
[8] Harrington, 1933.
[9] Libby, 1952.
[10] Krieger, 1954.
[11] Vaillant, 1935.
[12] Krieger, 1954.
[13] *Ibid.*

whereas the earlier types die out. Also present in these three horizons as well as Almagre are Catan Round-base and Matamoros Triangular. Both of these appear to be diminutive Abasolo Round-base and Tortugas Triangular. In La Salta times one new type became prominent: Armadillo Stemmed. It may well be a diminution of Morhiss Stemmed or Gary Contracting Stemmed types.

With the final horizon of the Los Angeles Phase in Tamaulipas, five new types appear. They are all small and have a basic triangular outline, though Diablo Corner-notched and Pasitas Side-notched have lateral notches. Fresnos Triangular, Starr Concave, and Los Angeles Concave seem to be variants of a single theme. Also continuing into this horizon are the earlier smaller points, namely, Matamoros Triangular, Catan Round-base, and Armadillo Contracting Stemmed, as well as a few others.

There is considerable evidence of continuity and development in this sequence. For example, Tortugas Triangular may very well develop into Matamoros Triangular, which, in turn, could have given rise to Fresnos Triangular and Starr Concave. Abasolo Round-base may be ancestral to Catan Round-base. Almagre Contracting Stemmed may be ancestral to Gary Contracting Stemmed, which, in turn, is ancestral to Armadillo Stemmed. There is a possible development also from Ensor Side-notched into Pasitas Side-notched, and from Palmillas Corner-notched into Diablo Corner-notched.

When one looks back on the whole sequence, there seems to be a basic continuity of projectile points with developments taking place within the basic types along with introductions and changes because of outside influences, which in turn give rise to new local developments. These internal developments and changes make it possible to separate the points into types and the complex of types, plus other artifact types, into a series of phases.

Let us now turn to the aberrant points, some of which are useful in aligning our nine phases from Tamaulipas with those from other areas. Aberrant Type 2 is a Plainview point.[14] This certainly must be interpreted as indicating that the Nogales horizon at least overlaps temporally with those archaeological complexes that include Plainview points. Aberrant Type 3 is a Kinney point. Points of this type appear in the Pecos River Focus, the Falcon Focus, the Aransas Focus, and the Edwards Plateau Aspect of Texas.[15] Thus Almagre may be aligned with these Texas cultural complexes. Aberrant Type 4, Flacco Indented Base, ties the Almagre horizon of the Sierra de Tamaulipas in with the Flacco horizon of the Sierra Madre of Tamaulipas. Aberrant Type 5 is a Langtry Stemmed point.[16] One occurs in the Almagre horizon and the other in the La Salta horizon. Since Langtry Stemmed points are diagnostic of the Pecos River Focus of Texas, it would seems that our sequence from Almagre through La Salta is roughly contemporaneous with it. Aberrant Type 6, Pogo points,[17] and Aberrant Type 7, Pueblito Basal-notched, as yet, have not been found to be trade points. Aberrant Type 8 is a small obsidian point made from a lamellar flake. This type of point is quite common in the Valley of Mexico during Teotihuacan times.[18] Thus the Eslabones Phase and part of Teotihuacan appear to be contemporaneous. Aberrant Type 9 is dissimilar to any I have studied from other areas. Aberrant Type 10 looks very much like some of the Hayes points of the Haley Focus of east Texas.[19] If this is truly a trade point, then part of the Los Angeles Phase and the Haley Focus should be contemporaneous. Aberrant Type 11 is a Toyah point from Texas and would seem to indicate that the later stages of the Los Angeles Phase and the Toyah Focus, perhaps representing the material culture of the Jumano tribe of central Texas, are contemporaneous.[20] Aberrant Type 12 is a Cameron Triangular point and came from the surface of Tm c 81.[21] It seems likely that this point belongs with the Los Angeles Phase remains of that cave. If this is true, then the late phases of the Los Angeles culture may be connected with the historic period of the Brownsville Focus of southernmost Texas.

Now the question becomes, what can these projectile points tell us about the life and technology of the ancient inhabitants of Tamaulipas? At the outset one thing is apparent as far as Tamaulipas is concerned. The use of the bow and arrow does not seem to have occurred until Los Angeles Phase times. Earlier, the preferred weapon was either the spear or the atlatl with a dart. There seems also to have been a shift through time in the manner of hafting projectile points to shafts. Up until the late part of the La Perra Phase, one method seems to have been used. In this method the base of the projectile point was smeared with a gum and then inserted into a slot at the end of the main shaft. This slot was V-shaped, and when the base of it was wrapped tightly with string the upper part of the slot gripped the surfaces of the projectile point. Since the string was wound only around the shaft and was below the base of the projectile point, it was only the gum or tar and the sides of the slot that actually held the point in place. Starting with Almagre times, stemmed projectile points appear, indicating a new method of hafting. With these points the stem of the projectile point was fitted into a slot in the mainshaft, and string was wrapped around both the mainshaft and

[14] Krieger, 1947.
[15] Suhm and Krieger, 1954.
[16] *Ibid.*
[17] *Ibid.*
[18] Linné, 1934.
[19] Suhm and Krieger, 1954, and Krieger, 1947.
[20] Kelley, 1947.
[21] *See* p. 74.

TABLE 3

DISTRIBUTION OF PROJECTILE POINT TYPES IN THE SIERRA DE TAMAULIPAS

Excavated components		Grand Total	Crudely Chipped Point Fragments	Finely Chipped Point Fragments	Total Bases and/or Complete Points	Resident types																				Aberrant types											
						Lerma Double-pointed	Abasolo Round-base	Nogales Triangular	Tortugas Triangular	Almagre Stemmed	Gary Stemmed	Kent Stemmed	Palmillas Corner-notched	Ensor Side-notched	Morhiss Stemmed	Matamoras Triangular	Catan Round-base	Armadillo Contracting Stem	Fresnos Triangular	Starr Concave	Diablo Corner-notched	Los Angeles Concave	Pasitas Side-notched	Tamaulipas Triangular	Plainview	Kinney	Flacco Indented Base	Langtry	Pogo	Pueblito Basal-notched	Teotihuacan Side-notched	San Fernando Stemmed	Hayes	Toyah	Cameron Triangular
Los Angeles Phase	Tm c 81, layer 1	49	8	6	35		3	1	3					2		6	1	1	3	6		6														
	Tm c 82, layer 1	41	18	9	14			2	1					1		1			1	2		2														
	Tm c 82, layer 2	27			27		5	6	5					2	1	1				1		2													
	Tm c 314, layer 1	142	24	19	99		10	6	4	1			3	2	8	19	13	10	4	8	4	4								1					
	Tm c 83, level 1	7	2	2	3								3			1			1	2	1	6									1				
	Tm c 83, levels 2 and 3	13	2	4	7				1							1		1	1	1															
	Total Los Angeles points	279	54	40	185		18	15	14	1			6	7	10	29	14	12	10	20	6	13	6							1	1	1		1	
	Percentages of Los Angeles Point Types				1.00		.10	.08	.08				.03	.04	.06	.16	.08	.07	.06	.11	.03	.07	.03												
La Salta Phase	Tm c 314, layer 2	24	3	1	20				1	1			2	3	5		1	5									1								
	Tm c 79, levels 1 and 2	4		2	2									1	1																				
	Total La Salta points	28	3	3	22				1	1			2	4	6		1	5									1			1					
	Percentages of La Salta Point Types				1.00				.04	.05			.09	.18	.27		.05	.22									.05			.05					
Eslabones Phase	Tm r 6, levels 1–3	25	6	7	12								3	1	5	1	1												1						
	Tm c 81, layer 2	38	8	9	21	1	5		3				2	5	4																				
	Tm r 86, levels 1–4	7	4	2	1										1															1					
	Tm c 82, layer 3	50	18	8	24		2	2	6				2	3	4	2	2																		
	Total Eslabones points	120	36	26	58	1	7	2	9				7	9	14	3	3													1					
	Percentages of Eslabones Point Types				1.00	.01	.12	.04	.16				.12	.16	.26	.05	.05														1 .01	1 .01	1 .01			
Laguna Phase	Tm r 88, levels 1–2	13	7	3	3						1			1	1																				
	Tm r 172, levels 1–4	23	3	4	16		2				3		2	2	4	1	2																		
	Tm c 174, layer 1	28	8	7	13		2	3	4		2					2																			
	Total Laguna points	64	18	14	32		4	3	4		6		2	3	5	3	2																		
	Percentages of Laguna Point Types				1.00		.13	.09	.13		.19		.06	.09	.16	.09	.06																		
Almagre Phase	Tm c 82, layer 4	53	13	4	36		12	6	15	1	1																								
	Tm c 315, level 5	32	8	1	23		6	1		2	7	5	2	1												?								
	Tm c 315, levels 6–7	29	3	3	23		7	3		3	5	3	1															1						
	Tm c 314, layer 3	9	1		8		2	1	2	2	1																								
	Total Almagre points	123	25	8	90		27	11	17	8	14	8	3	1												?		1							
	Percentages of Almagre Point Types				1.00		.30	.12	.19	.09	.16	.09	.04	.01														.01							
	Tm c 315, levels 1–4	124	22	1	101	1	18	29	25	7	13														6		1	1							
La Perra Phase	Tm c 315, levels 8–9	11	3	1	7		1		4	2																									
	Tm c 174, layer 2	17	5		12		4	2	5	1																									
	Tm c 174, layer 3	6	1		5	1	1		3																										
	Tm c 82, layer 5	61	19		42		15	10	17																										
	Total La Perra points	95	28	1	66	1	21	12	29	3																									
	Percentages of La Perra Point Types				1.00	.01	.32	.18	.44	.05																									
Nogales Phase	Tm c 82, layer 6	47	16		31		19	8	4																										
	Tm c 81, layer 3	26	6		20		13	4	3																										
	Tm c 314, layer 4	14	6		8		4	3	1																										
	Tm c 82, layer 7	28	5		23	2?	17	3																	1										
	Total Nogales points	115	33		82	2?	53	18	8																1										
	Percentages of Nogales Point Types				1.00	.02	.65	.22	.10																.01										
	Tm c 174, layer 4	2	1		1	1																													
	Tm c 81, layer 4	27	8		19	7	7	1	4																										
Lerma Phase	Tm c 174, layer 5	3	2		1	1																													
	Tm c 174, layer 6	4	1		3	3																													
	Tm c 81, layer 5	10	3		7	6																		1											
	Total Lerma points	17	6		11	10																		1											
	Percentages of Lerma Point Types				1.00	.91																		.09											
	TOTAL EXCAVATED POINTS	993	234	93	666	23	155	90	111	20	33	8	20	24	35	35	20	17	10	20	6	13	6	1	1	6	1	1	2	1	1	3	1	1	1

TABLE 3—*Continued*

Surface Components		Grand Total	Crudely Chipped Point Fragments	Finely Chipped Point Fragments	Total Bases and/or Complete Points	Resident types																			Aberrant Types
						Lerma Double-pointed	Abasolo Round-Base	Nogales Triangular	Tortugas Triangular	Almagre Stemmed	Gary Stemmed	Kent Stemmed	Palmillas Corner-notched	Ensor Side-notched	Morhiss Stemmed	Matamoros Triangular	Catan Round-Base	Armadillo Contracting Stem	Fresnos Triangular	Starr Concave	Diablo Corner-notched	Los Angeles Concave	Pasitas Side-notched	
Los Angeles	Tm c 293	11			11		4		3		2			1					1					
	Tm c 325	1			1													1						
	Tm c 222	1			1																	1		
	Tm c 312	4			4									1		1		1		1				
	Tm c 316	1			1															1				
	Tm c 308	1			1														1					
	Tm c 294	1			1															1				
	Tm c 84	2			2		1									1								
	Tm c 85	1			1											1								
	Total Los Angeles points	23			23		5		3		2			2		3		2	2	3		1		
	Percentages of Los Angeles Point Types				1.00		.21		.13		.09			.09		.13		.09	.09	.13		.04		
La Salta	Tm r 323	14	4	3	7		1		1				2	2			1							
	Tm r 322	2			2		1		1															
	Total La Salta points	16	4	3	9		2		2				2	2			1							
	Percentages of La Salta Point Types				1.00		.22		.22				.22	.22			.12							
Eslabones	Tm r 304	2		1	1						1													
Laguna	Tm r 301	3			3						1		1					1						
	Tm r 302	1			1									1										
	Tm r 324	26	6	5	15		3		3			1	4	1		1	1	1						
	Tm r 196	1			1								1											
	Tm r 195	12	4		8		1		1				1		2	1		2						
	Tm r 194	2			2								1				1							
	Total Laguna points	45	10	5	30		4		4		1	1	8	2	2	2	2	4						
	Percentages of Laguna Point Types				1.00		.13		.13		.03	.03	.27	.07	.07	.07	.07	.13						
Almagre	Tm c 321	6			6				1		1			2			1	1						
	Tm c 305, east end	20	4		16		4		3		2				1	4	1	1						
	Tm c 291	10			10				1		4	1	2	2										
	Tm c 175	5			5		2		1			2												
	Tm c 339	3			3				1		2													
	Tm c 300	3			3		1		1		1													
	Tm c 179	5	2		3		1	1			1													
	Total Almagre points	52	6		46		8	1	8		11	3	2	4	1	4	2	2						
	Percentages of Almagre Point Types				1.00		.17	.02	.17		.25	.04	.04	.09	.02	.09	.04	.04						
La Perra	Tm c 175a	1			1				1															
	Tm c 317	2			2				2															
	Tm c 189	5			5		2		2								1							
	Total La Perra points	8			8		2		5								1							
	Percentages of La Perra Point Types				1.00		.25		.63								.12							
Nogales	Tm c 290	23	13		10		5	2	2								1							
	Tm c 176	1			1		1																	
	Tm c 177	3			3		2	1																
	Tm c 313	1			1		1																	
	Tm c 89	2			2		2			?														
	Total Nogales points	30	13		17		11	3	2								1							
	Percentages of Nogales Point Types				1.00		.64	.18	.12								.06							
Lerma	Tm c 305, west end	7			7	7																		
TOTAL SURFACE POINTS		183	33	9	141	7	32	4	24	?	15	4	12	10	3	9	7	8	2	3		1		Aberrant Points
GRAND TOTAL OF PROJECTILE POINTS		1176	267	102	807	30	187	94	135	20	48	12	32	34	38	44	27	25	12	23	6	14	6	20

the enclosed stem of the projectile point. This method, which started in Almagre times, was basically similar to that which occurred in Laguna, Eslabones, and La Salta. During these latter horizons, notched points appeared. A study of the gum on the point shows it was set in a slot until the top of the mainshaft extended slightly above a line drawn from one notch to the other. The base of the point was cemented to the shaft by gum, while a string going through the notches and around the two sides of the split mainshaft further fastened the point. Of course, older methods of hafting continued to be used with the Catan Round-base and Matamoros types as well as the Morhiss Stemmed type. The final change in hafting took place during the Los Angeles Phase times. During this period the types were fastened to the shaft without the use of gum. Analogous specimens from the Sierra Madre of Tamaulipas reveal that the point was set in a slot, string then being wrapped around the shaft below the point, with some strands of string continuing up and around the point, either passing through the notches or crossing the body above the junction of the base and lateral edges.

In summary, the sequence of points shows a number of trends, indicating changes in cultural concepts as well as improvements in techniques. (1) Spears and darts gave way to bows and arrows. (2) Projectile points diminished in size. (3) The chipping became better and better throughout the sequence. (4) Methods of hafting showed steady improvement, and during historic times the tips were firmly gripped to the mainshafts. (5) The proportion of projectile points to other chipped stone artifacts increased steadily. However, this increase was not so much due to a larger number of points being made but to fewer choppers and scrapers occurring.

PROJECTILE POINT TYPES

Lerma Double-pointed

(Fig. 23, No. 22–27, p. 63)

Twenty-three whole specimens of this type were found in excavation while seven were picked up from the surface of Tamaulipas sites. At the University of Texas I briefly studied about fifty more found in that state.

Form and Dimensions: Specimens of this type are pointed at both ends and have convex edges. They may be considered to be laurel-leaf in outline. One heavily-patinated point (fig. 23, No. 22), which I consider to be a variant of the type, has rather fine grinding for about 20 mm. up from the base. This gives it a crude appearance of having an incipient contracting stem. Points vary between 43 and 90 mm. in length, with the majority being about 65 mm. long. The two shortest specimens came from Layer 7 of Tm c 82 and may be either late variants of the type or another type. Both are also thinner than the rest and show finer pressure flaking. Maximum width of all points is at the midpoint or just slightly below it. Most of these points are between 20 and 30 mm. wide, the average being 23 mm. All but six of this type are very thick in comparison with the width. The larger ones are between 9 and 20 mm. thick with an average of about 12 mm. The other six, four of which are wider and shorter than the average, are about 7 mm. thick.

Technique: Most specimens are made from thick flakes and bear crude percussion flaking on both surfaces. Pressure flaking is found only along the edges. On all but the four short wide thin points, this pressure flaking is poorly done.

Temporal Range: This is the earliest point type in the Sierra de Tamaulipas and is confined to the Lerma Phase. In the Valley of Mexico one of this type was found with the second mammoth at Santa Isabel Iztapan, and Dr. Walter Taylor informs me that this type or a related one is the earliest in Coahuila.[22] North of Tamaulipas they appear to last into more recent times.

Geographical Range: In Tamaulipas this point type is confined to the Sierra de Tamaulipas. The type also occurs over most of Texas.[23]

Relationships: There is a possibility that these points are related to smaller similar ones at El Jobo, Venezuela,[24] in the Huancaya horizon of Peru,[25] and the Shell Fishhook culture in northern Chile.[26] There are also similar ones from the San Dieguito horizon of California,[27] the Ventana Cave in Arizona,[28] and from Oregon,[29] British Columbia and the Yukon.

Use: On the basis of the large size of this type, I would guess they were lance or spear points.

Ibasolo Round-base

(Fig. 23, No. 15–21, p. 63)

This description is based on a study of over 1,000 specimens; 155 came from excavations in the Sierra de Tamaulipas.

Form and Dimensions: These points are roughly tear-drop shaped in outline. They have convex bases that gradually merge into convex sides, which taper to a point. They range from 38 to 76 mm. in length with an average of about 45 mm. Maximum width, which is usually at the junction of base and sides, ranges from 20 to 42 mm., with the average being about 27 mm. In maximum thickness they fall between 8 and 17 mm.

Technique: The points bear, on their surfaces, irregular pressure flaking which often radiates from the centre toward the edges. The edges bear retouching.

[22] Taylor, personal communication.
[23] Suhm and Krieger, 1954.
[24] Cruxent and Rouse, 1956.
[25] Tschopik, 1946.
[26] Bird, 1938.
[27] Rogers, 1939.
[28] Haury, 1950.
[29] Cressman, 1942.

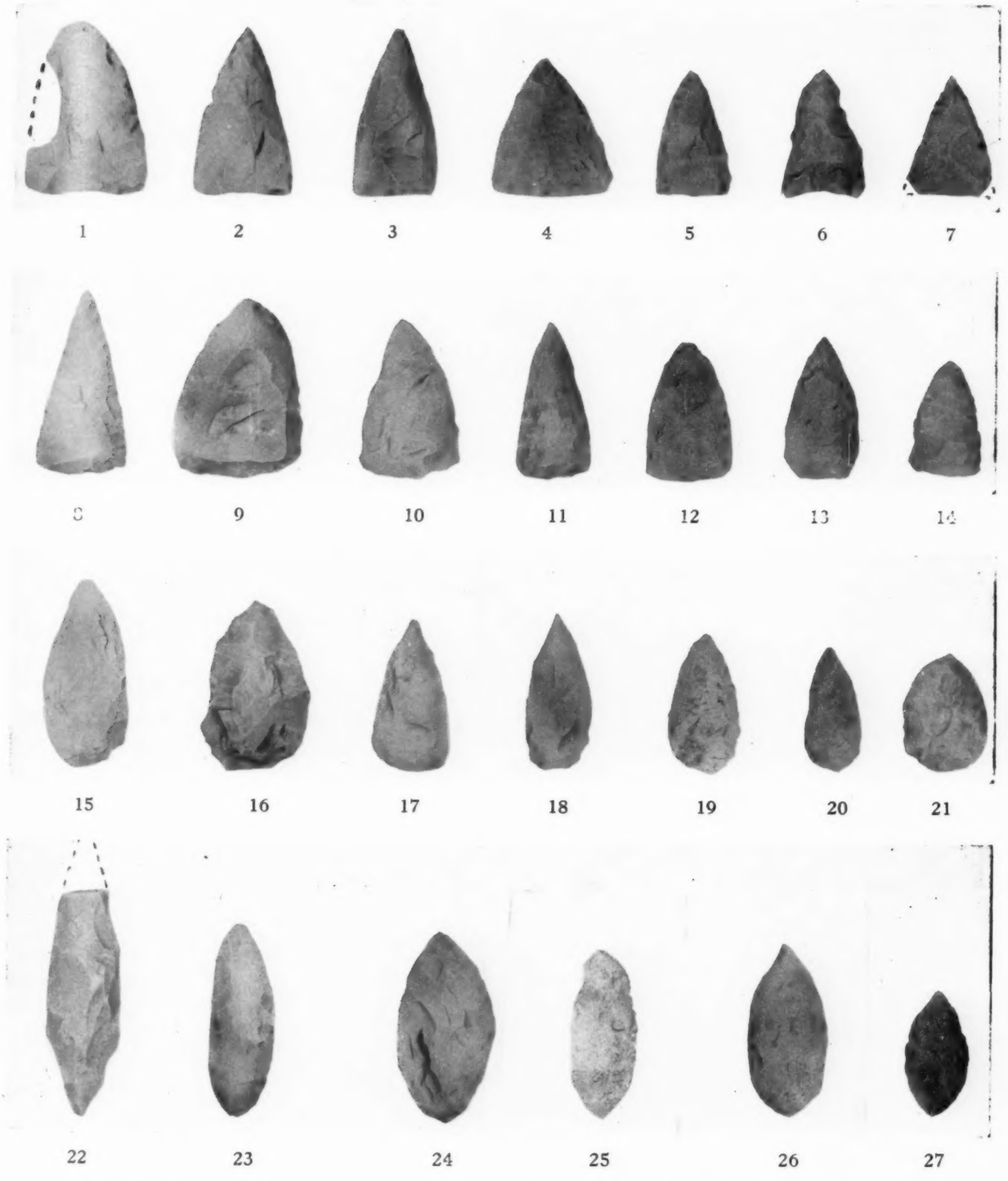


FIG. 23. Projectile point types (1/2 natural size). 1–7. Tortugas Triangular. 8–14. Nogales Triangular. 15–21. Abasolo Round-base. 22–27. Lerma Double-pointed.

Often the tips have been steeply retouched on opposite edges and sides to form bevelled points. About 30 per cent have this feature. The bases are also retouched and occasionally have basal thinning.

Temporal Range: These points first appear in earliest Nogales times and are the dominant type. They continue in relatively large numbers through the Almagre Phase and then occur as a minority in the other parts of the sequence.

Geographical Range: This specific type is widespread in Tamaulipas and Texas. Points of this rather generalized shape have a very wide distribution in North and South America. The greatest concentration, however, is in Tamaulipas.

Relationships: As this is a widely used form, specific relationships are difficult to delineate. In the Valley of Mexico a point closely resembling this type was found by de Terra in the El Risco formation, definitely in a layer before pottery. De Terra considered such points as being diagnostic of his so-called Chalco Complex.[30] Similar points also appear in the Formative Period at Uaxactun [31] and in the Valley of Mexico;[32] in both places they are the only form in the earliest periods. Somewhat farther afield they appear with Folsom points at Lindenmeier,[33] in all cultural stages at Ventana Cave,[34] and with Plainview points in the Great Plains.[35] Generally speaking, they are an old style that lasts into earliest ceramic times. In Tamaulipas they are obviously ancestral to Catan Round-base and are the same as the larger varieties of the Desmuke points in southern Texas.

Use: It has been suggested that these points were quarry blanks. This may be true for some of them, but many from our excavations had gum or tar around their bases to facilitate hafting. Since atlatl shafts were found in Layer 2 of Tm c 174, in which four Abasolo Round-base points were also uncovered, it is not unlikely that this type of point tipped atlatl darts or foreshafts.

Nogales Triangular

(Fig. 23, No. 8–14, p. 63)

About eight hundred specimens of this type have been examined, ninety of which were found in our excavations in the Sierra de Tamaulipas.

Form and Dimensions: These points are roughly isosceles triangles, though their tapering sides are slightly convex and their bases range from being straight to convex. In length they range between 40 and 70 mm. with an average of about 50 mm. In width they range from 21 to 40 mm. with an average of about 30 mm; and in thickness they fall between 3 and 6 mm.

Technique: Their surfaces bear both percussion and pressure flaking. Tips of one-quarter of the specimens have been retouched to form bevelled points. Bases have been thinned by retouching but do not bear basal flutes.

Temporal Range: In the Sierra de Tamaulipas they have about the same range as Abasolo Round-base, but they are always a minority type, having no great concentration at any time period.

Geographical Range: They are common in all of Tamaulipas and appear in southern Texas. The so-called gouge found with the first Iztapan Mammoth may represent a southward extension of the type.[36]

Relationships: This type is often difficult to distinguish from Abasolo Round-base and Tortugas Triangular. However, it differs from Abasolo Round-base in having base and sides at some sort of acute angle and in having a different temporal trend. It differs from Abasolo Triangular in not having a concave base or a basal flute, as well as appearing earlier in time and having a different temporal trend. They are probably ancestral to Matamoros Triangular.

Use: As these points, like Abasolo Round-base, occur in layers with atlatl shafts, there is a good possibility that they tipped atlatl darts or foreshafts. The fact that two from Almagre cave have gum on their base supports this hypothesis.

Tortugas Triangular

(Fig. 23, No. 1–7, p. 63)

This study is based on about 1,000 specimens, 111 of which came from excavations in the Sierra de Tamaulipas.

Form and Dimensions: These points are in the form of isosceles triangles. Edges are straight to slightly convex and taper to a point. All bases are concave. In these points there is a considerable range of size: the length varies between 38 and 75 mm. with the average being about 50 mm. long; widths at the base range from 25 to 46 mm., with an average of 32 mm.; maximum thicknesses between 3 and 8 mm. with an average of about 5 mm., the depth of concavity varies between 1 and 4 mm.

Technique: Points bear percussion pressure-flaking on their surfaces and have retouching along their edges. About half of them have retouching at the tips, causing them to be bevelled. All of them have some sort of thinning in the basal region, and many have a basal flute on each basal surface, which has been struck off by percussion flaking after the points were completed.

Temporal Range: In the Sierra de Tamaulipas, beginning in Late Nogales times, these points reached their maximum concentration in La Perra times and

[30] De Terra, 1949.
[31] Kidder, 1947.
[32] Vaillant, 1930.
[33] Roberts, 1935.
[34] Haury, 1950.
[35] Davis, 1953.
[36] Aveleyra, 1953.

diminished to a minority type during Almagre times. Though they are occasionally found in components belonging to later phases, I do not believe that they were commonly made after Almagre times. In northern Tamaulipas and adjacent parts of Texas they might have lasted somewhat longer.

Geographical Range: They are common throughout Tamaulipas and San Luis Potosí in Mexico. They are most common in southwest Texas, though they appear in most parts of the state.[37]

Relationships: These points are possibly ancestral to Matamoros Triangular and were probably derived from Nogales Triangular.

Use: Three of this type were found in the Sierra Madre attached to their original shafts. The two smaller ones were attached to atlatl foreshafts and had been inserted into a V-shaped slot and stuck to it with gum. The V-shaped slot then had been closed against the basal flutes of the points by a tightening of string around the foreshaft, just below the base of the point. The other, larger point had been inserted into the slot at the end of a piece of thick cane, which served as a lance shaft. Thus it is safe to conclude that the larger Tortugas points were lance tips, while the smaller ones were tips of dart foreshafts.

Almagre Contracting-stemmed

(Fig. 24, No. 45–48, p. 66)

I have studied only about thirty of this type from Tamaulipas; twenty came from excavation. Dr. Krieger of the University of Texas also showed me some points of this type from that state.

Form and Dimensions: In outline these are more or less in the shape of wide diamonds. Points range from 45 to 100 mm. in length and average about 60 mm. Their maximum width at the shoulders is from 25 to 40 mm., averaging about 35 mm. In thickness they range from 5 mm. to 15 mm. Bodies are roughly triangular with convex edges and about three times as long as their pointed incipient stems.

Technique: The surfaces of the body bear rough percussion flaking, while the edges have retouching. Some of the retouching on the edges of the body was so forceful that the edges have a slightly serrated appearance.

Temporal Range: These points appear in Late La Perra times and carry through the Almagre horizon.

Geographical Range: Most of the specimens we found in the Sierra de Tamaulipas, but a few were picked up from different parts of the state. In Texas they seem to be most numerous in the Big Bend area and extend half-way across the state; they are exceedingly rare in the eastern portions.[38]

Relationships: In our preliminary excavations in Tamaulipas these points were considered aberrant trade points, but later work uncovering the Almagre horizon indicated that they are probably a resident type. As far as Tamaulipas is concerned, this type could be the ancestor of Gary Stemmed.[39] In the southwestern part of the United States this type, often called the Gypsum Cave type,[40] appears before points similar to Gary Stemmed. Kelley has told me that this is also true of the Big Bend area of Texas.[41]

Use: Since Gypsum Cave points, like our Almagre Stemmed ones, have been found hafted at Gypsum Cave, Nevada, I believe it is safe to conclude they were hafted in a similar manner in Tamaulipas. Therefore I would suspect that the basal incipient stems were inserted in V-shaped slots of foreshafts and that string was wrapped around these slots and the tip of the stem to hold them fast. The larger ones may have been hafted as knives, as such are found in Gypsum Cave, and perhaps a few of these larger ones were spear points, as Krieger suggests.

Gary Stemmed

(Fig. 24, No. 34–40, p. 66)

I have studied only about fifty of this type from Tamaulipas but have been shown hundreds more from Texas; thirty-three came from excavations in the Sierra de Tamaulipas.

Form and Dimensions: Points of this type have triangular bodies with straight to convex edges, well-defined pointed or corner-tanged shoulders, and long contracting stems with pointed or rounded bases. They range in length from 35 to 78 mm., with an average of 46 mm. At their shoulders they are between 18 and 43 mm. wide, with an average of 31 mm. The stems are usually about a third of the length of the whole point. The shoulder are usually at right angles to the main axis of the body, and about a tenth of these points have a slight corner tang.

Technique: The surfaces and bodies usually bear rough percussion flaking, while the body's edges have relatively steep retouching. The bases of many points, particularly of pointed ones, are thin and as sharp as the tip.

Temporal Range: These points begin in Tamaulipas and reach their greatest concentration in the Almagre Phase, but they last through the Laguna, Eslabones, and La Salta Phases. This seems to be about equal to their temporal range in west Texas.

Geographical Range: These occurred over all of Tamaulipas and Texas. Either the same type or a similar related type appeared at about the same time throughout the southwest and the southeastern United States.[42]

[37] Suhm and Krieger, 1954.

[38] Krieger, personal communication.

[39] *Ibid.*

[40] Harrington, 1933.

[41] Kelley, personal communication.

[42] Suhm and Krieger, 1954.

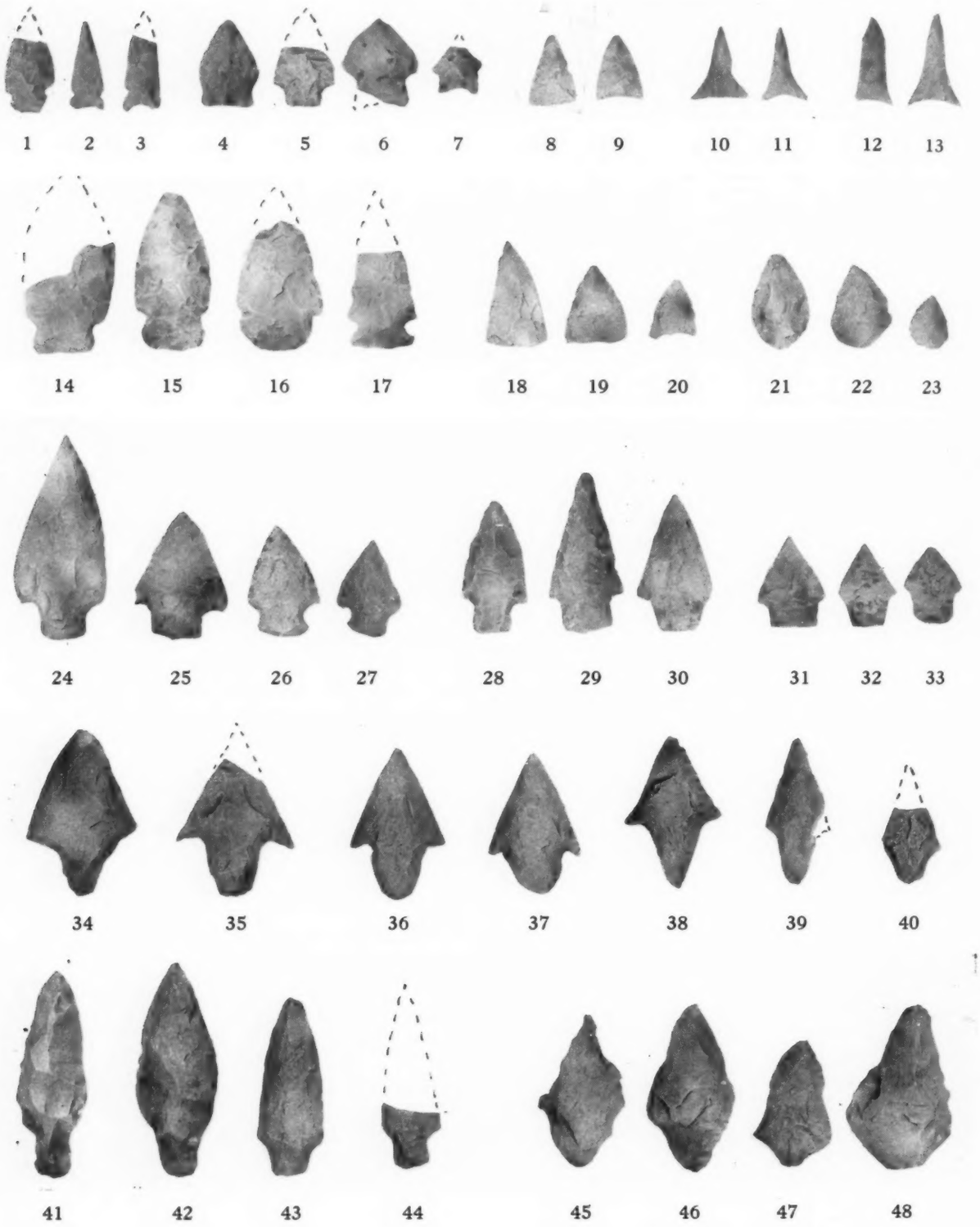


FIG. 24. Projectile Point Types (1/2 natural size). 1–3. Pasitas Side-notched. 4–7. Diablo Corner-notched. 8–9. Fresnos Triangular. 10–11. Starr Concave. 12–13. Los Angeles Concave. 14–17. Ensor Side-notched. 18–20. Matamoros Triangular. 21–23. Catan Round-base. 24–27. Palmillas Corner-notched. 28–30. Morhiss Stemmed. 31–33. Armadillo Contracting-stemmed. 34–40. Gary Stemmed. 41–44. Kent Stemmed. 45–48. Almagre Contracting-stemmed.

Relationships: As previously stated, this type probably developed out of Almagre Contracting-stemmed or Gypsum Cave points. It very much resembles Langtry Stemmed which appears with it in west Texas but rarely in Tamaulipas or east Texas.

Use: Most of the points we found with the Almagre Phase had tar or gum on their contracting stems indicating that the stem was probably inserted in a slot cemented with gum and then held fast by string being wound around the split shaft as well as the enclosed contracting stem. In the Big Bend area of Texas, points of this type have been found in atlatl foreshafts, so we can conclude that these points were dart points.

Kent Stemmed

(Fig. 24, No. 41–44, p. 66)

Eight occurred in Cueva Humada (Tm c 315) and four were collected from the surface.

Form and Dimensions: The bodies of these points are long isosceles triangles with convex edges. They have a weak shoulder, a straight narrow stem, and a straight to convex base. They range in length from 35 to 78 mm. with an average of about 62 mm. Their maximum width is at the shoulders or just slightly above it and range from 22 to 28 mm. with an average of 26 mm. Stems are 12 to 22 mm. long and from 12 to 18 mm. wide. Thicknesses range from 7 mm. to 15 mm.

Technique: These points are very crudely chipped and bear rough percussion flaking on their surfaces. The edges are retouched, but even this retouching is not well done.

Temporal and Geographical Range: In Tamaulipas they occur only in the Almagre Phase, though a few have been found with components of the Abasolo complex in northern Tamaulipas. In Texas they are most common in the Aransas Focus on the central Gulf Coast[43] but occasionally appear in central and east Texas.

Relationships: This type looks like an intruder into Tamaulipas from Texas, but might be ancestral to Morhiss Stemmed. Actually these few Tamaulipas specimens are somewhat larger than those in Texas, but until our Tamaulipas sample is more adequate there seems to be no justification for subdividing this type.

Use: The size of these points would suggest that they tipped lances or darts propelled by atlatls. One or two of the larger ones might even have been knife blades.

Palmillas Corner-notched

(Fig. 24, No. 24–27, p. 66)

Sixty-two of these were found in Tamaulipas, but only twenty came from our excavations near the Canyon Diablo.

Form and Dimensions: These points have triangular bodies with convex edges. They have a wide corner-notch and a narrow flaring stem with a straight to convex base. They range in length from 36 to 82 mm., with 44 mm. being about average. Widths at the shoulders are from 25 to 36 mm., with an average of 29 mm. Thicknesses run from 3 to 9 mm. The corner notches are from 5 to 11 mm. wide and 3 to 8 mm. deep. Stems, which are slightly flaring, are about 16 mm. wide and from one-quarter to one-sixth of the total point length.

Techniques: The bodies of these points show fairly well-controlled percussion flaking on their surfaces and steep retouching along their edges.

Temporal Range: In Tamaulipas a few of these points appear in the late phases of Almagre times, but they really are more characteristic of the La Salta, Eslabones, and Laguna Phases. In the Sierra Madre of Tamaulipas they appear only in the Palmillas culture which is roughly equivalent to La Salta and Eslabones.

Geographical Range: Except for southwestern Tamaulipas, where there is a high concentration of these points, this type appears as a minority through Tamaulipas and Texas.

Relationships: In the Late Formative of the Valley of Mexico, similar points appear.[44] Some of the Tamaulipas specimens also are very much like the Williams points of central Texas.[45] As Krieger has pointed out, this type appears in the Archaic times throughout most of the eastern United States but reaches its greatest concentration in early ceramic periods.[46]

Use: The size of these points suggests they were probably dart points. The presence of gum and tar on their contracting stems but not on their bodies suggests that the stems were inserted into slots of darts and string tied around the end of the slots above the tar and through the corner notches.

Ensor Side-notched

(Fig. 24, No. 14–17, p. 66)

Thirty-seven were found in Tamaulipas while twenty-four came from excavation. I also had the opportunity to look at a number of other specimens of this type from Texas at the University of Texas.

Form and Dimensions: These points have tapering, slightly convex edges, a convex to very slightly concave base, and small notches just above the base. They range from 30 to 95 mm. in length, averaging about 56 mm.; their maximum width, which is often at the base but occurs occasionally just above the side-notches, is between 26 and 30 mm., and they are about 6 mm. in maximum thickness. Their notches are between 3 and 7 mm. wide and about 4 mm. deep.

[43] *Ibid.*

[44] Vaillant, 1931.

[45] Suhm and Krieger, 1954.

[46] *Ibid.*

Technique: These points have irregular percussion flaking on their surface and retouched edges. Some look like Nogales Triangular that have been notched.

Temporal Range: These occur mainly with the Laguna, Eslabones, and La Salta horizons in Tamaulipas, though one was found in an Almagre level in Tm c 82.

Geographical Range: They occur sparingly over most of eastern Tamaulipas; their greatest concentration seems to be in central Texas.

Relationships: There are no related types in Tamaulipas, but, in Texas, Trinity points are similar. The Tamaulipas Ensor points are a little different from those in Texas in that concave bases rarely occur and the maximum width is sometimes just above the notches. Perhaps this is a basis for further subdividing the type.

Use: Their size suggests they were dart or spear points. Four of these points have gum or tar on their bases. On one point there are two strips of tar, about 15 mm. wide, on both surfaces, extending up from the base. If the width of the adhesive may be considered to equal the shaft width, then this one was certainly hafted to a dart or spear. Further study of this gum or tar reveals that in all cases it covers the basal surface up to a line from one notch to the other. I have interpreted this to mean that the point was set in a slot and the lower base cemented in by gum while a string passed through the notch and over the top of the shaft, securing the point further.

Morhiss Stemmed

(Fig. 24, No. 28–30, p. 66)

Thirty-nine specimens were examined from Tamaulipas, thirty-five of which came from excavation. I also cursorily examined about fifty at the University of Texas from that State.

Form and Dimensions: These have isosceles triangular bodies with straight to slightly convex edges, a small straight or very slightly contracting stem, a straight to slightly convex base, and a small weak shoulder. Points range from 38 to 95 mm. in length, averaging about 52 mm.; maximum width at the shoulder falls between 23 and 32 mm., with an average of 25 mm.; and the maximum thickness is between 4 and 9 mm. Stems range in length from 8 to 20 mm. and are from 12 to 20 mm. in width.

Technique: Surfaces bear irregular flaking scars, while edges are retouched on both surfaces.

Temporal Range: In the Sierra de Tamaulipas this type is confined to the Laguna, Eslabones, and La Salta Phases.

Geographical Range: They are frequent in Sierra de Tamaulipas, occur sparingly in northern Tamaulipas, and across central Texas, and are common in Victoria County, Texas.[47]

Relationships: In Tamaulipas they are related to Mesa Stemmed of the Sierra Madre, while the Yarborough Points of east Texas are very similar.

Use: Their size and weight suggest they were dart or spear points.

Matamoros Triangular

(Fig. 24, No. 18–20, p. 66)

About 550 points were studied, 35 of which came from excavation in the Sierra de Tamaulipas.

Form and Dimensions: These points are roughly in the form of equilateral or isosceles triangles. They have convex lateral edges and straight to concave bases. The depth of the concavity in the base is always less than 2 mm. They range in length from 18 to 40 mm., averaging about 26 mm.; from 16 to 26 mm. in width, averaging 21 mm.; and from 6 to 12 mm. thick.

Technique: They are immediately distinguishable from Fresnos Triangular by their cruder chipping and greater maximum thickness. Surfaces have crude percussion flaking but may sometimes display part of the original unworked flake. The edges are retouched, and about one-quarter of the points have bevelled points. Bases are thinned either by retouching or by the removal of large flakes on either surface (by percussion?) producing a short basal flute.

Temporal Range: This type begins with the earliest pottery in the Sierra de Tamaulipas (though it is with a pre-pottery horizon in the Sierra Madre) and reaches its greatest concentration in the Los Angeles Phase.

Geographical Range: The type is common all over Tamaulipas and occurs in southwest and coastal Texas.

Relationships: Evolved from Nogales and Tortugas Triangular, this type might also be ancestral to Fresnos Triangular. It is probably related to similar triangular types widespread in North America in late prehistoric times.

Use: Like Catan Round-base, this type occurs in horizons with dart fragments as well as in horizons having arrows. Earlier it was perhaps a dart point and later an arrow point. Semi-circular areas above the base of gum indicate that the point was probably inserted in a V-shaped notch at the end of a shaft. The shaft was closed against the point base (in the flute, when it existed) by tightening string around the shaft just below the base of the point.

Catan Round-base

(Fig. 24, No. 21–23, p. 66)

Only 20 of these occurred in excavation in the Sierra de Tamaulipas, but 131 occurred in the diggings in the Sierra Madre. From the surface and sites on the coast of Tamaulipas I have examined 22, as well as about 50 from Texas.

Form and Dimensions: These are roughly teardrop shaped in outline, being from 15 to 37 mm. in length,

[47] *Ibid.*

averaging 23 mm.; 15 to 26 mm. in width, averaging 18 mm.; and from 3 to 13 mm. thick averaging about 7 mm.

Technique: Some surfaces bear crude percussion flaking while many display only the flat surfaces of the original flakes. They are usually fairly thick in the centre of their surfaces but thinned by pressure flaking to taper to a sharp-edged base. All the edges are retouched, and the points of about one-quarter of them are bevelled, that is, one edge adjacent to the point has steep retouching on one surface, while the opposite edge has steep retouching on the opposite surface.

Geographical Range: This type occurs over most of Tamaulipas, adjacent parts of Texas, and the Gulf Coast of Texas.

Temporal Range: In the Sierra de Tamaulipas this type occurs sparingly with all pottery horizons, but in the Sierra Madre it is numerous in the latest preceramic Guerra Phase, and I believe it is equally early in the Falcon Dam area of Texas.

Relationships: This type is obviously derived from Abasolo Round-base, and in my initial study many of the larger varieties of Catan Round-base points in the early ceramic levels were considered to be Abasolo points. However, study of stratigraphic remains from Romero's Cave in the Sierra Madre revealed that round-based points under 39 mm. in length appear suddenly in Guerra times. This temporal significance justified my defining them as a distinct type and reclassifying these specimens from the Sierra de Tamaulipas. Some of the smaller varieties of Desmuke points from southwest Texas [48] are identical to Catan points, and I can at present see no temporal or spatial justification for setting up a separate Desmuke Point type for Tamaulipas.

Use: It has been suggested that these points were quarry blanks for arrow points. Perhaps some of them were, but most were not. A number of points have small bell-shaped areas of gum on their surfaces just above the base. This gum certainly was to facilitate hafting for actual use. The lack of gum toward the lateral edges of the point suggests that the point was inserted into a V-shaped slot at the end of the shaft and that the slot was closed by winding string around the shaft, not around the point itself. Since these points appear in levels with only dart-shaft fragments (Guerra Phase in the Sierra Madre) as well as in horizons with arrow shafts (Los Angeles Phase), I have concluded that these are both dart and arrow points.

Armadillo Contracting-stem

(Fig. 24, No. 31–33, p. 66)

Only twenty-five of this type were studied, seventeen of which came from excavation.

Form and Dimensions: These points have short triangular bodies with straight to convex edges and a short straight to slightly contracting stem with a straight to slightly convex base. The stem is separated by a very narrow well-defined shoulder, but, in a few cases the stem blends into the body with little or no break in outline. Points vary in length from 15 to 35 mm., with an average length of 28 mm. The maximum width is at the shoulder, being about 16 mm., though they range from 12 to 28 mm. Stems are about 9 mm. long, ranging from 6 to 14 mm.; width of the base is usually about 12 mm., and maximum thickness usually about 7 mm.

Technique: These short stubby points bear good percussion flaking on their surfaces and pressure flaking along their edges. The stem of one specimen has ground edges.

Geographical and Temporal Range: This type has been found only in the Sierra de Tamaulipas. It occurs with La Salta Phase remains and lasts into the Los Angeles Phase.

Relationships: Many of these points look like diminutive Morhiss or Gary points and may well be derived from them.

Use: They are small enough to have been arrow points. The occurrence with Los Angeles remains favors this conclusion. However, many occurred with La Salta Phase materials that lack any bow-and-arrow remains, so perhaps these points were used on darts as well as on arrows. Their stems bear tar or gum with string impressions, showing that string was wrapped around the ends of shafts and the stems.

Fresnos Triangular

(Fig. 24, No. 8–9, p. 66)

Ten points of this type came from Sierra de Tamaulipas excavations, seven from those in the Sierra Madre, and seven from those of the coast. More than fifty occurred in surface collections from Tamaulipas, and I have examined more than two hundred from southern Texas.

Form and Dimensions: These isosceles triangular points have convex lateral edges and straight to concave bases. They are between 15 and 37 mm. in length, averaging about 26 mm.; 15 to 22 mm. wide, averaging about 17 mm.; and from 2 to 8 mm. thick.

Technique: They were manufactured from thin flakes. The surfaces and edges bear pressure-flaking scars.

Temporal Range: In Tamaulipas they occur during Los Angeles time, while elsewhere they seem to occur in late prehistoric and early historic times.

Geographical Range: North America.

Relationships: This type resembles types widespread over much of North America. It is also similar to points of Cape Denbigh in Alaska [49] and of the Neo-

[48] *Ibid.*

[49] Giddings, 1951.

lithic in northeastern Siberia.[50] One cannot help wondering whether it spread from Asia as part of a bow-and-arrow complex.

Use: These were arrow points, probably inserted in a slot and held by cordage wrapped around the end of the shaft below the base of the point, causing the edge of the slot to grip the surface of the point. Gum or tar on the base of some points indicates this substance was also used to keep them in the arrow shafts.

Starr Concave

(Fig. 24, No. 10, 11, p. 66)

Twenty occurred in excavations in the Sierra de Tamaulipas, eleven in those in the Sierra Madre, fourteen from the Tamaulipas coast; eighty were collected on the surface of Tamaulipas sites, and over four hundred were examined from sites in Cameron and Starr Counties in Texas.

Form and Dimensions: These small isosceles triangular points have concave bases and from straight to concave lateral edges. They range in length from 23 to 37 mm., averaging about 28 mm.; from 15 to 24 mm. wide, with an average width of 19 mm.; and are usually about 4 mm. thick.

Technique: These points were made from thin flakes. Many show pressure flaking on their surfaces, and all have delicate retouching along their edges.

Temporal Range: These points occur during Los Angeles Phase times and are often associated with Las Flores and Panuco remains in the Huasteca. They probably were made from A.D. 900 to 1800.

Geographical Range: This type is found in all of Tamaulipas as well as in adjacent parts of Vera Cruz and San Luis Potosí in Mexico. In Texas it occurs along the Gulf Coast in the lower Rio Grande drainage.[51] It seems to have its greatest concentration in Starr and Cameron Counties, Texas.

Relationships: It is closely related to Fresnos Triangular and is probably related to similar points that appear at late prehistoric times over most of North America.

Use: I consider these to be arrow points, since one of this type was found hafted to a cane arrow shaft in the Sierra Madre of Tamaulipas. It was inserted into a V-shaped slot and string was bound around the slot below the base of the arrow, then crossed over the lower lateral edge and then back to the shaft of the arrow. This is like the method used on the side-notched types.

Diablo Corner-notched

(Fig. 24, No. 4–7, p. 66)

Six were found in excavation, but surface collections netted eight more.

Form and Dimensions: These points have wide triangular bodies with wide corner-notches and straight to slightly concave bases. The largest is 29 mm. long; its widest part (just above the corner notches) is 2.6 mm., and it is about 5 mm. thick. The smallest, which has its tip missing, may have been approximately 26 mm. long, 23 mm. wide, and about 5 mm. thick.

Technique: Points are made from thin flakes. They were shaped by pressure-flaking, and the edges are retouched. However, the initial pressure-flaking is not too well done.

Geographical and Temporal Range: At present confined to the Los Angeles Phase of the Canyon Diablo.

Relationships: These are similar to Jaumave Corner-notched of southwest Tamaulipas and Scallorn points of central Texas,[52] though Diablo Corner-notched are more squat. They may have been derived from Palmillas Corner-notched.

Use: Their size and association with Los Angeles Phase remains suggests they were arrow points.

Los Angeles Concave

(Fig. 24, No. 12, 13, p. 66)

Fifteen specimens of this type were examined, and thirteen of them were uncovered in excavation.

Form and Dimensions: These points are roughly bell-shaped in outline. Bases are concave (1 to 4 mm. deep). The edges converge but slightly from the base for about three-quarters of the length of the body, and may be straight or very slightly concave. The final one-quarter of the edges are convex and turn into a short abrupt point. The points all range between 20 and 33 mm. in length and between 10 and 15 mm. in width, and are always less than 4 mm. in thickness.

Technique: These points, often paper thin, are made from thin flakes bearing delicate pressure flaking on their surfaces and along their edges.

Temporal and Geographical Range: These are a late prehistoric and early historic type that have been found only in late Los Angeles components in the Sierra de Tamaulipas.

Relationships: It is a type identical to Talco points of the Titus Focus of northeast Texas.[53] However, since there is not a continuous distribution of these two point types across Texas and northern Tamaulipas, it seems best to consider them separate types.

Use: Since arrow shafts were found in the same deposits as these points, they are probably arrow points.

Pasitas Side-notched

(Fig. 24, No. 1–3, p. 66)

Six specimens were found in excavation. The points of two were broken off, as were those of the five collected on the surface.

[50] Okladnikov, 1950.
[51] Krieger, 1951.
[52] *Ibid.*
[53] *Ibid.*

Form and Dimensions: These are narrow isosceles triangular points with side notches 2 mm. wide, and a concave base about 2 mm. deep. The edges are slightly convex. Though I have seen only two whole specimens, neither these nor the broken ones would seem to have been more than 37 mm. long and more probably average 30 mm. In width the widest point is 17 mm., while the narrowest is 11 mm. None are thicker than 3 mm.

Technique: These were made from thin flakes whose surfaces bore percussion flaking scars, while the edges were made by pressure flaking.

Temporal Range: In the Sierra de Tamaulipas they appear in later components of the Los Angeles Phase, probably after the discovery of America up until A.D. 1750.

Geographical Range: Points of this type have so far been found only in the Sierra de Tamaulipas.

Relationships: These points may be directly related to the side-notched points in the Huasteca found with ceramics of the Las Flores (V) and Panuco (VI) phases.[54] They also are similar to the San Antonio and San Lorenzo Side-notched types of southwest Tamaulipas.[55] In Texas their nearest counterpart is the widespread Harrel point.[56] It is possible that Pasitas Side-notched developed from Ensor Side-notched.

Use: These were probably arrow points, as similar types have been found hafted to cane arrow shafts or split wood foreshafts that fitted into the mainshafts of arrows.

ABERRANT POINTS

Aberrant 1: Tamaulipas Triangular

(Fig. 25, No. 14, p. 72)

This one specimen was found in the tan silt of Tm c 81.

Form and Dimensions: It is 65 mm. long and has a maximum width at its base of about 28 mm. Its base is straight, and its edges gradually taper to a point, though they are slightly excurvate. It has a maximum thickness about half-way between its tip and base of slightly less than 5 mm.

Technique: This point appears to have been first chipped bifacially by percussion until it was fairly thin. Then large basal flakes were chipped off to form its straight base. Next, pressure flaking removed rather large parallel flakes which run from a median ridge to its edges. As these parallel flake scars end at the edges, they give them a serrated appearance.

Geographical and Temporal Range: This single projectile point was found in Layer 5, Tm c 81. Though I know of no similar points, except possibly the Meserve Point of Nebraska,[57] I consider Tamaulipas Triangular in the Canyon Diablo as possibly intrusive from some undiscovered culture.

Relationships: Unknown.

Use: This point may have been a spear or atlatl point.

Aberrant 2: Plainview Point

(Fig. 25, No. 13, p. 72)

Form and Dimensions: This point is made from light grey rhyolite with white shards in it (a material not found in any other artifacts I collected in Tamaulipas) which has been weathered since the artifact was manufactured. The tip is unfortunately broken, but originally the point must have been between 50 and 75 mm. in length; the maximum width is at the base, being about 24 mm. The edges near the base have been ground.

Technique: It has a rough median ridge, which is crossed by a series of crude oblique parallel ripple flakes. The similarity in dimensions, size, and technique to specimens 725-2 and 725-10 from the Plainview site is very remarkable.[58]

Geographical Range: This is the farthest south that a Plainview point has ever been reported, the nearest other occurrence being in the Falcon Dam area where Borbolla and Aveleyra found the base of a Plainview-like point associated with Falcon Focus materials (which are somewhat similar to Nogales).[59] In Texas, similar points are fairly common, and Krieger has listed a number of other occurrences from Texas northward into Alaska.[60]

Temporal Range: In the Canyon Diablo this point is with the Nogales Phase materials. As Krieger has pointed out, this type is often found in very early recent or late Pleistocene contexts.[61] In Tamaulipas it may be somewhat later but not necessarily so.

Relationships: This point is definitely closely related to the Plainview type. In the Nogales context, made, as it is, of foreign material, I cannot help but consider it a trade point into Tamaulipas.

Use: Possibly a dart or spear point.

Aberrant 3: Kinney Point

(Fig. 25, No. 12, p. 72)

Six points of this type occurred in the top mixed levels of Almagre Cave.

Form and Dimensions: These points have bodies that have parallel (or slightly convex) edges for half their length and then taper with convex edges to a point. Bases are always concave with a depth of concavity be-

[54] *See* p. 186.
[55] MacNeish, MS.
[56] Suhm and Krieger, 1954: 500.
[57] E. Mott Davis, 1953: fig. 133, *e* and *g*.
[58] Krieger, 1947: Pl. 3, 1, and Pl. 9, 1.
[59] Borbolla and Aveleyra, 1953.
[60] Krieger, 1947.
[61] *Ibid.*, table 3.

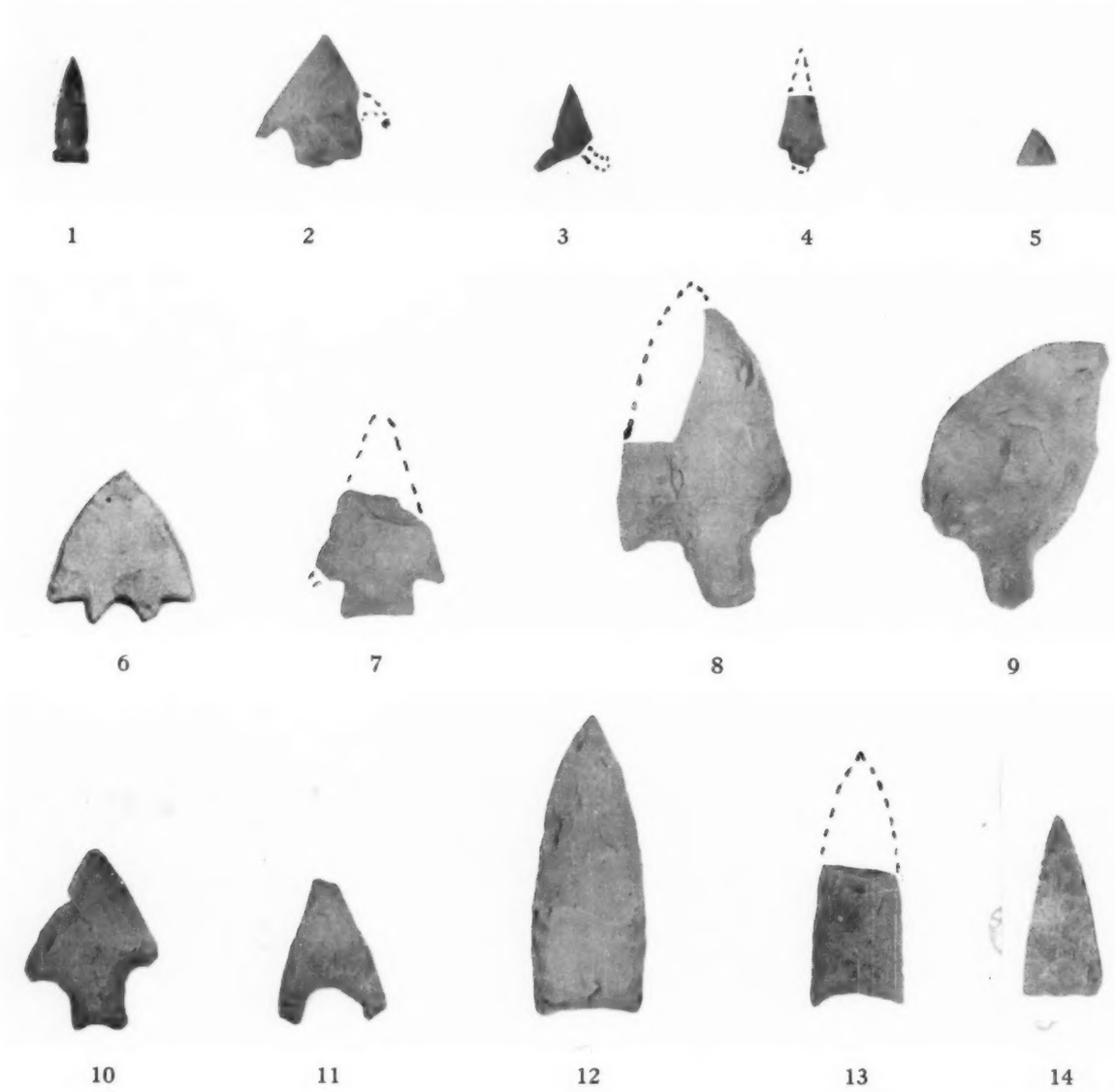


FIG. 25. Aberrant Points (1/2 natural size). 1. Teotihuacan Side-notched. 2. San Fernando Stemmed. 3. Toyah Points. 4. Hayes Points. 5. Cameron Triangular. 6. Basal Double-tanged. 7. San Fernando Stemmed. 8–9. Pogo Points. 10. Langtry Stemmed. 11. Flacco Indented-base. 12. Kinney Point. 13. Plainview Point. 14. Tamaulipas Triangular.

tween 1 and 3 mm. Points range from 56 to 93 mm. long (averaging 73 mm.), have a maximum width at their base of from 30 to 40 mm., averaging 34 mm., and all are about 8 mm. in maximum thickness.

Technique: Their surfaces have wide diagonal or straight pressure flaking crossing them (not ripple flaking). The edges are neatly retouched, and the points are not bevelled. On three of them the lateral edges from 12 to 25 mm. up from the base are ground. Three of them have basal thinning (i.e., two to five long narrow flakes removed from the base), while three have relatively large flutes extending up from the base on one or both surfaces.

Temporal Range: These points all occurred in a redeposited layer in Cave Tm c 315 above Almagre and La Perra remains. I suspect they originally came from an Almagre level.

Geographical Range: They occur in Tamaulipas only at Almagre Cave but are more common in the Edwards Plateau Aspect of central Texas, the Pecos Focus of the Big Bend area of west Texas, the Aransas Focus of the central Texas Gulf Coast, and along the lower Rio Grande in the Falcon Focus.[62]

Relationships: When I first found these, I considered them to be Clovis points, but they are not, as their

[62] Suhm and Krieger, 1954.

maximum width is at the base and not at the midpoint A few of the smaller ones resemble Plainview points, but the lack of co-lateral or ripple flaking and the occurrence of basal fluting make them distinguishable. My personal opinion is that they developed from Tortugas Triangular and are in reality an elongation of that type.

Use: As these are too long and heavy to be used as dart points, they may be lance points or knives.

Aberrant 4: Flacco Indented-base

(Fig. 25, No. 11, p. 72)

One Flacco Indented-base occurred with Almagre remains in the Sierra de Tamaulipas, but seven occurred in the Flacco Phase in the Sierra Madre of southwest Tamaulipas. I shall describe only the one with Almagre remains.

Form and Dimensions: This point is triangular in outline with short convex sides and a wide deeply-indented base. It is 40 mm. long, 31 mm. wide, 6 mm. thick, and its concave base is 10 mm. deep.

Technique: The point bears neat pressure flaking on both its surface and edges.

Temporal Range: This point was found with Almagre remains in the Sierra de Tamaulipas but the type is diagnostic of the Flacco Phase of southwest Tamaulipas.

Geographical Range: Except for this one point, all others of the type occurred in southwest Tamaulipas.

Relationships: Possibly derived from Tortugas Triangular.

Use: In the Sierra Madre, two of this type occurred with atlatl remains.

Aberrant 5: Langtry Stemmed

(Fig. 25, No. 10, p. 72)

Three of these were found on the Laguna ruin, and one was uncovered in the excavation. One also occurred at Tm c 88.

Form and Dimensions: These points are between 35 and 70 mm. in length, with the maximum width at their shoulders ranging from 20 to 35 mm. Maximum thickness is between 4 and 6 mm. The bodies are about twice the length of the stems, and the edges taper from the shoulder to the tip. The shoulders are pointed or have a very slight tang, and gradually blend into a tapering stem with a narrow convex base.

Temporal Range: In the Sierra de Tamaulipas, points of this type are confined to the Laguna Phase.

Geographical Range: These points have their centre of concentration in the Big Bend area of Texas,[63] but they extend southward into Coahuila[64] and down the Rio Grande into northern Tamaulipas.[65] They also occur in central Texas as intrusive points.[66]

[63] Kelley, Campbell and Lehmer, 1940: fig. 1.
[64] Taylor, personal communication.
[65] *See* this report, p. 193.
[66] Kelley, personal communication.

Relationships: This point type may very well be related to the contracting stemmed types in the Ticoman[67] and Teotihuacan[68] horizons of the Valley of Mexico. It is obviously related to Gary Points.[69]

Use: As points of this type have been found hafted to atlatl dart foreshafts in the Big Bend area of Texas, I consider specimens of this type to be dart points.

Aberrant 6: Pogo Point

(Fig. 25, No. 8, 9, p. 72)

Two of this type occurred.

Form and Dimensions: Both of these large points have wide triangular bodies, short narrow stems, and well-defined shoulders. One is 80 mm. long, 45 mm. wide, and 12 mm. thick, with a stem 15 mm. wide and long, and at an acute angle to the triangular body. The other is 92 mm. long, 50 mm. wide, 14 mm. thick, and has a straight stem 20 mm. long and 15 mm. wide.

Technique: Both have crude chipping on their surfaces and retouched edges.

Temporal Range: They occur with remains of the Almagre Phase.

Geographical Range: Besides the specimens from the Sierra de Tamaulipas, Krieger records some from east Texas.[70]

Relationships: Unknown.

Use: Their size and weight suggest they were lance tips or knife blades.

Aberrant 7: Basal Double-tanged

(Fig. 25, No. 6, p. 72)

This point was found on the surface of the Pueblito site, Tm r 6.

Form and Dimensions: This point is 40 mm. wide, 40 mm. long, and has a maximum thickness of 4 mm.

Technique: This point shows fairly even pressure chipping on its surface and retouched edges.

Temporal Range: Eslabones Phase.

Geographical Range: Sierra de Tamaulipas.

Relationships: This point is not exactly like any other I have seen. It is vaguely like Montrell Points from Texas[71] and similar to a few of the smaller Pedernales Points.[72] Personally I think it is a sport.

Use: Its size suggests it was a dart point.

Aberrant 8: Teotihuacan Side-notched

(Fig. 25, No. 1, p. 72)

One point of this type was uncovered.

Form and Dimensions: This obsidian point is 28 mm. long, 50 mm. wide at its base, and has a maximum

[67] Vaillant, 1931.
[68] *Ibid.*
[69] *See* p. 65.
[70] Suhm and Krieger, 1954.
[71] Suhm and Krieger, 1954: 452.
[72] *Ibid.*, 471.

thickness of 2 mm. It has a long tapering tip with excurvate edges and a straight base. About 2 mm. above the base are side-notches about 2 mm. and 1 mm. deep.

Technique: The point was made from a lamellar flake, truncated in cross-section, which undoubtedly was struck from a prepared core. The tip of the flake has been retouched on both surfaces so that original flat planes of the blade are not noticeable. However, as the rest of the point has been retouched only along its edges on both sides, the planes of the original specialized blade are discernible.

Temporal Range: This point was uncovered in Layer 2 of Tm c 81, a component of the Eslabones Phase.

Geographical Range: This type of obsidian point is found in Mexico at Teotihuacan (Periods III–IV),[73] at Tula,[74] at Tajin,[75] and at Panuco,[76] as well as at a number of other places.[77]

Relationships: On the basis of the material (obsidian) and the form, I suspect this point is intrusive in the Eslabones Phase and may be considered a trade object. One wonders whether the Mexican variety and the points of similar form in the Southwest, Texas,[78] the Plains,[79] and some parts of the Mississippi Valley,[80] may not all be genetically related.

Use: Points of this size are usually considered arrow points. However, since they occur at Teotihuacan, where many paintings of people using atlatls occur (and not using the bow-and-arrow), it may be that they also were used as dart points.

Aberrant 9: San Fernando Stemmed

(Fig. 25, No. 7, p. 72)

Two of this type appeared in the Sierra de Tamaulipas, while five were found along the San Fernando River.

Form and Dimensions: They all have isosceles triangular bodies, a slight shoulder tang, a straight stem, and a concave base. Most have broken basal sections, but I woud guess they average about 55 mm. long, 30 mm. at the shoulder, and 5 mm. thick. Stems range from 4 to 14 mm., with an average of 11 mm.

Technique: Surfaces have been percussion-flaked, and edges show pressure flaking.

Temporal and Geographical Range: Central Tamaulipas.

Relationships: Unknown.

Use: It was probably a dart point.

[73] Linné, 1934: figs. 307 and 311.
[74] Acosta, personal communication.
[75] Du Solier, 1945, Lámina D, row 3, No. 3 and 5.
[76] Ekholm, 1944: fig. 55p.
[77] Suhm and Krieger, 1954.
[78] *Ibid.*
[79] Strong, 1935.
[80] Griffin, 1952.

Aberrant 10: Hayes Points

(Fig. 25, No. 4, p. 72)

Only one occurred in excavation in the Sierra de Tamaulipas; three were found on the Tamaulipas coast.

Form and Dimensions: They all have isosceles triangular bodies with straight sides, well-defined shoulders, and bulbous stems with rounded bases. All are about 28 mm. long, 12 to 18 mm. wide, and about 3 mm. thick. Stems are about 6 mm. long and wide.

Technique: Surfaces have pressure flaking on them, and edges are neatly retouched. One is almost serrated.

Temporal and Geographical Range: In Tamaulipas they belong to the late prehistoric and early historic Los Angeles Phase of the Sierra de Tamaulipas and Catan complex of central Tamaulipas Gulf Coast.[81]

In Texas they occur in the Caddo area, most frequently in the Haley Focus.

Relationships: Unknown.

Use: Their small size suggests these were arrow points.

Aberrant 11: Toyah Point

(Fig. 25, No. 3, p. 72)

About a dozen of these points were found in eastern Tamaulipas, though only one was recovered in excavation.

Form and Dimensions: All are equilateral triangles in outline with deep concave bases and small side notches. They range from 20 to 30 mm. in length and from 15 to 20 mm. in width.

Technique: All have neat retouching on their surfaces and along their edges.

Temporal and Geographical Range: These occurred with the late prehistoric and historic Los Angeles Phase of the Sierra de Tamaulipas, the Catan Complex of the central Tamaulipas coast,[82] and with the Brownsville and Barril Complexes in the Rio Grande Delta.[83] In Texas they have been found with the Toyah Focus of central and west Texas.[84]

Relationships: Unknown.

Use: Evidence from the Trans-Pecos suggests they were arrow points.

Aberrant 12: Cameron Triangular

(Fig. 25, No. 5, p. 72)

One was found on the surface of Tm c 81.

Form and Dimensions: These are small equilateral triangles from 8 to 17 mm. long and wide.

Technique: They are made from a thin flake, and their edges are finely retouched.

[81] *See* pp. 165–193.
[82] *See* pp. 165–193.
[83] *See* pp. 165–193.
[84] Suhm and Krieger, 1954.

Temporal and Geographical Range: In the Sierra de Tamaulipas, the specimen was associated with the historic Los Angeles Phase. A few have been found with the late prehistoric or early historic Catan complex remains of the central Tamaulipas coast. They are most common in the Brownsville Complex in Cameron County, Texas. In this complex they are often made of rum-bottle glass and appear with remains suggesting historic times:

Relationships: These may represent the final diminution of Matamoros Triangular.

Use: Arrow points or points for toy arrows.

2. SCRAPERS

Scrapers are here defined as tools that are plano-convex in cross-section and bear retouching along part or all of the edge of the convex surface. In actual use, some of these tools may have been used as knives or cutting tools as well as for scraping. They are common in the Sierra de Tamaulipas; *727* were recovered. There is a tendency for the larger scrapers to appear in the earlier levels and the smaller ones in later levels. In the manufacture of the scrapers there is a minor shift in flint-working technique. The earlier peoples used mainly thick flakes which they retouched along the edges, while the later peoples either used flakes which they retouched over the entire convex surface or special flakes that had been struck from prepared polyhedral cores. In terms of the stratigraphic sequence, the majority of the scrapers belong to the pre-pottery periods, though they are fairly common in the Los Angeles Phase. It may be that the La Salta, Eslabones, and Laguna peoples were wearing cotton clothing rather than leather.

In the sequence, pebble end-scrapers are confined to the Diablo Complex. Occurring with them are large flake side-scrapers that continue to be used up until the end of the Almagre Phase. The Lerma Phase has two distinctive kinds of scrapers, both of which could have been hafted: triangular snub-nosed end-scrapers and stemmed end-scrapers. Also present in this horizon are large rough plano-convex end-scrapers. These continued to be made in fair amounts through the Almagre horizon. Nogales sees the introduction of spoke shaves, gouges, and large plano-convex disk scrapers. All of these continue through the Almagre horizon. Also beginning in the Nogales Phase are thin flake side-scrapers. These remain common throughout the sequence right up to historic times.

The La Perra Phase sees the addition of only one new scraper type: skin smoothers. These do not long outlast the La Perra horizon. The Almagre Phase, while having many of the scraper types previously mentioned, introduces teardrop-shaped keeled end-scrapers and crude lamellar flakes made from conical polyhedral cores with a striking platform at an acute angle to the lateral fluting. While the former type is limited to the Almagre Phase, the latter continues until historic times. With the beginning of pottery, the Laguna Phase, we see the advent of obsidian rectangular lamellar flakes. These were probably struck from cylindrical polyhedral cores with a striking platform at right angles to the fluting. The Eslabones and La Salta Phases continue to use the same scraper types. The Los Angeles Phase introduces pointed lamellar flakes, long, thin, flake end-scrapers, and very small disk scrapers, though many of the older types continue. It would appear that in this final period most of the skin-scrapers were probably hafted, while in previous horizons hafting was less common.

Pebble End-scraper

(Fig. 26, No. 12, p. 77)

Only one was found in excavation, just below and in front of the gravels of the high terrace in cave Tm c 81. However, in our dirt piles at Tm c 81 I found parts of three more that evidently came from that general region, but which my workers, taking them for split chunks of gravel or boulders belonging to a high terrace, must have discarded. The one found *in situ* is a fragment of a split ovoid boulder about 70 mm. wide, 70 mm. long, and 40 mm. thick, which has retouching along the exterior surface of the pebble adjacent to its split portion. This type of artifact is not found in later horizons and is in reality the nearest thing (that exists at present) to a diagnostic Diablo trait.

Large Flake Side-scrapers

(Fig. 26, No. 13–14, p. 77)

In excavation 108 of these were found, the earliest of them from the Diablo levels. They actually bear little resemblance in form to one another, other than being large and flat on one side, and having retouching along one of the longer edges on the opposite side. The largest one was 125 mm. long, 75 mm. wide, and 38 mm. thick, and was roughly ovoid, while the smallest was rectangular, 49 mm. long, 45 mm. wide, and 20 mm. thick. Two have a ridge on their dorsal side, but I believe this is accidental rather than purposive. Two have retouching along both longer sides. All of them give the appearance of having been rough flint cores or nodules which had been split and then retouched along one of the sharper edges adjacent to the break on the dorsal side. This type of scraper occurs in the Nogales, Repelo, and Abasolo horizons in northern Tamaulipas, while in the Sierra de Tamaulipas they occur in both the Diablo layer and all the Nogales layers, and appear to die out in Almagre times. Such scrapers were probably not hafted but held in the hand for scraping.

TABLE 4

DISTRIBUTION OF SCRAPER TYPES IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components Surface components	Total Scrapers	Pebble End-scraper	Large Flake Side-scraper	Snub-nosed End-scraper	Stemmed Scraper-like Tool	Large Plano-convex End-scraper	Thin Flake Side-scraper	Spoke-shaver	Gouges	Large Disk Scraper	Pebble Skin Smoothers	Keeled Teardrop End-scraper	Crude Lamellar Flake	Rectangular Lamellar Flake	Pointed Prismatic Flake Knife	Flake End-scraper	Small Disk Scraper
Los Angeles	Tm c 81, layer 1	14					1	7		1				1		3	1	
	Tm c 82, layer 1	12						6			3			1		1	1	
	Tm c 82, layer 2	17			1			8		1	3				2	1	1	
	Tm c 314, layer 1	37				1		22	1	4			1	2	1	1	3	1
	Tm c 220	5						3		1	1							
	Tm c 327	2															2	
	Tm c 308	1															1	
	Tm c 84	3					1										2	
	Tm c 85	1						1										
	Tm c 83, level 1	6						3								3		
	Tm c 83, levels 2 and 3	6						4								2		
	Total Los Angeles scrapers	104			1	1	2	54	1	7	7		1	4	3	11	11	1
	Percentages of Los Angeles Types	1.00			.01	.01	.02	.53	.01	.07	.07		.01	.04	.03	.10	.10	.01
La Salta	Tm r 78, level 2	1													1			
	Tm r 79, level 1	3													3			
	Tm c 314, layer 2	4		1			1						1	1				
	Total La Salta scrapers	8		1			1						1	1	4			
	Percentages of La Salta Types	1.00		.125			.125						.125	.125	.50			
Eslabones	Tm r 6, levels 1–3	15						12						2	1			
	Tm c 81, layer 2	4								1	1				1	1		
	Tm r 86, levels 1–3	2													2			
	Tm c 82, layer 3	7		1			1	2		1	1				1			
	Total Eslabones scrapers	28		1			1	14		2	2			2	5	1		
	Percentages of Eslabones Types	1.00		.03			.03	.50		.07	.07			.07	.20	.03		
Laguna	Tm r 86, levels 4–7	7						2						1	4			
	Tm r 88, levels 1–2	1													1			
	Tm r 324	4						4										
	Tm r 172, levels 1–4	8						3						1	4			
	Tm c 174, layer 1	6		1				2		1					2			
	Total Laguna scrapers	26		1				11		1				2	11			
	Percentages of Laguna Types	1.00		.04				.42		.04				.08	.42			
Almagre	Tm c 305, east end	1						9			1							
	Tm c 82, layer 4	14		1				9		1		1	1	1				
	Tm c 315, level 5	78		9			22	20		3	6	1	15	2				
	Tm c 315, levels 6–7	140		26	2	1	31	41	1	3	21		11	3				
	Tm c 314, layer 3	11		1				6		1			2	1				
	Total Almagre scrapers	244		37	2	1	53	76	1	8	28	2	29	7				
	Percentages of Almagre Types	1.00		.15	.01	.00	.22	.31		.03	.12	.01	.12	.03				
Mixed	Tm c 315, level 1–4	158		29	1		46	42	1	9	7		11	12				
La Perra	Tm c 175a	3		3														
	Tm c 315, levels 8–9	32		5			13	7	1	1	4		1					
	Tm c 174, layer 2	13					1	7		1	1	3						
	Tm c 174, layer 3	6						4		1	1							
	Tm c 82, layer 5	23		5			2	10		2	2	2						
	Total La Perra scrapers	77		13			16	28	1	5	8	5	1					
	Percentages of La Perra Types	1.00		.17			.21	.36	.01	.07	.10	.07	.01					
Nogales	Tm c 290a	5		2				2		1								
	Tm c 82, layer 6	9		3				2		1	2	1						
	Tm c 81, layer 3	12		3			3	1		1	4							
	Tm c 314, layer 4	15		1			4	6	1	3								
	Tm c 176	4		3				1										
	Tm c 313	1								1								
	Tm c 89	1						1										
	Tm c 82, layer 7	3		2				1										
	Total Nogales scrapers	50		14			7	14	1	7	6	1						
	Percentages of Nogales Types	1.00		.28			.14	.28	.02	.14	.12	.02						
Mixed	Tm c 174, layer 4	3		2				1										
	Tm c 81, layer 4	2					1	1										
Lerma	Tm c 174, layer 5	6		2	1	1	1	1										
	Tm c 174, layer 6	4		2	1		1											
	Tm c 81, layer 5	14		4	4	3	3											
	Total Lerma scrapers	24		8	6	4	5	1										
	Percentages of Lerma Types	1.00		.35	.26	.17	.21	.04										
Diablo	Tm c 81, layer 6	3	1	2														
	Grand Total of Scrapers	727	1	108	10	6	132	242	5	39	58	8	43	28	23	12	11	1

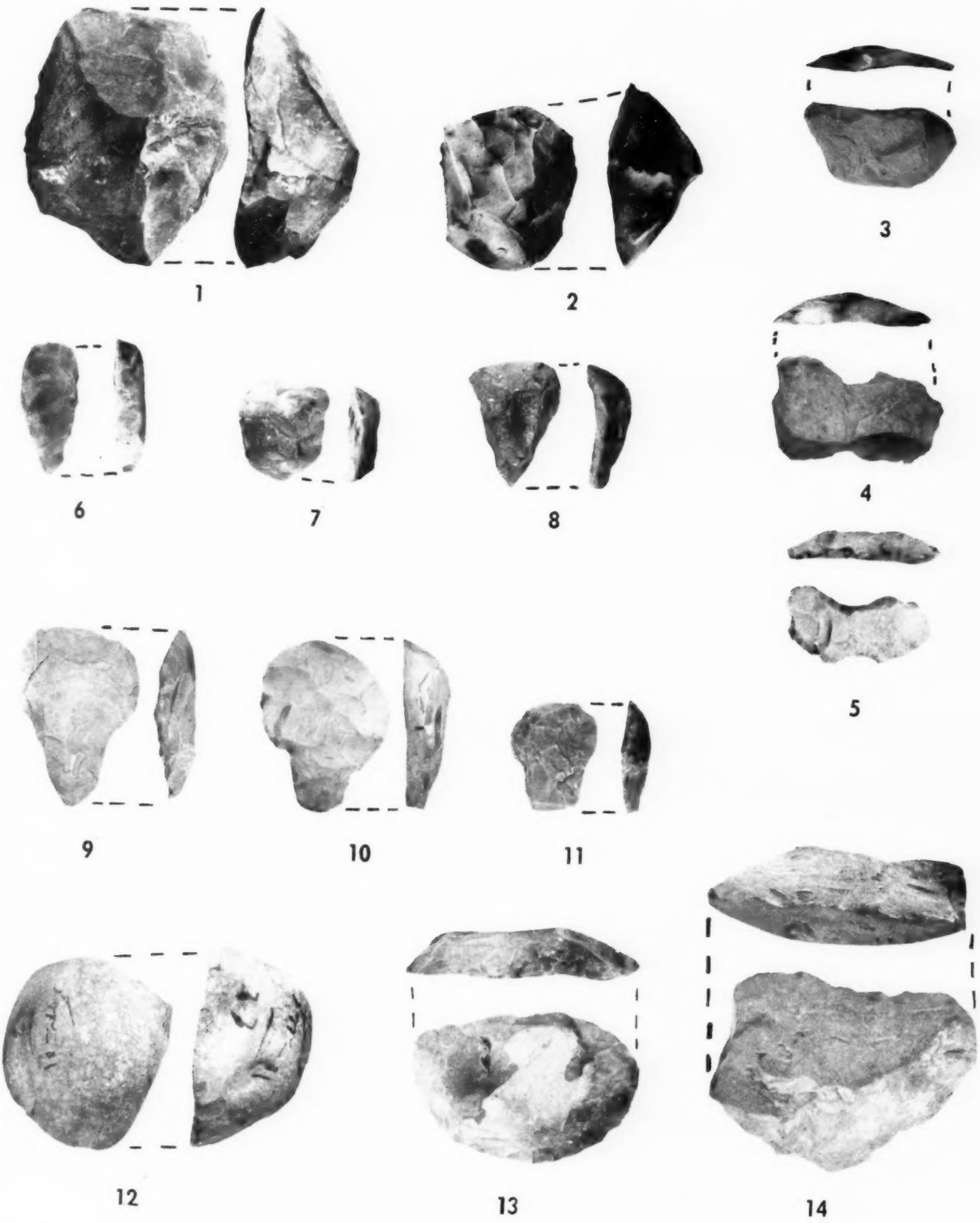


FIG. 26. Scraper types (1/2 natural size) (top and side view). 1–2. Large plano-convex end-scraper. 3. Thin flake side-scraper. 4–5. Spoke-shavers. 6–8. Snub-nosed end-scrapers. 9–11. Stemmed scraper-like tools. 12. Pebble end-scraper. 13–14. Large flake side-scrapers.

Snub-nosed Scrapers

(Fig. 26, No. 6–8, p. 77)

This type is represented by ten whole or fragmentary specimens. All of these are roughly triangular, or to be more exact, they look like pieces of pie. When looked at from above the retouched scraping end appears slightly convex while the sides are at an acute angle to the end and gradually taper to a point. They are between 40 and 70 mm. in length, between 22 and 40 mm. in width, and about 18 mm. thick. The ventral side is flat or slightly concave while the dorsal side is more or less flat on top with rather steep sides. The steepest and most retouched side is on the convex scraping end.

Such scrapers are extremely rare in Tamaulipas and have only been found in the Lerma layers of Tm c 174 and Tm c 81, with three from the Levels of Tm c 314. Aveleyra illustrates two scrapers from the Falcon Dam area that look very similar.[85]

Such implements were undoubtedly used to scrape or "flesh" skins (i.e., to remove the fatty layer of skin from the hide). In the light of the fact that the ends opposite the scraping ends are pointed and that such scrapers would be most difficult to hold in the hand while scraping, I suspect that they were hafted in some sort of a flat bone or wooden handle.

Large Plano-convex End-scraper

(Fig. 26, No. 1, 2, p. 77)

Five of these scrapers were found scattered through all the Lerma deposits, but 127 occurred in later horizons. Generally speaking, those from post-Lerma layers are slightly smaller. The Lerma ones are roughly ovoid in shape, being between 60 and 80 mm. in length, 30 and 50 mm. in width, and 20 and 40 mm. in thickness. The ventral sides are flat while the dorsal sides are convex and bear numerous percussion flaking scars. Actually, they look very much like a turtle shell. Usually there is fine pressure flaking on the dorsal surface along one of the edges of the shorter convex ends.

Though scrapers of this type were always found in Lerma levels, three were found in Layer 3 of Tm c 81 and four in Layer 4 of Tm c 314, Nogales layers, sixteen appeared in La Perra layers from Tm c 174, Tm c 315, and Tm c 82, and fifty-three in Almagre levels. North of the Sierra de Tamaulipas, a few occurred in Nogales (four), Repelo (one), and Abasolo (four) sites. In the Falcon Dam area Stevenson found eight at Site 41-78 139-4, which he called core scrapers.[86] Also, Aveleyra illustrates some from the Mexican portion of the Falcon Dam that evidently are the same.[87]

[85] Aveleyra, 1951: 52, pl. VI, E and F.

[86] Stevenson, 1951: 20.

[87] Aveleyra, 1951: 52, pl. VI, *b*, *c*.

It is possible to hold such an implement in the hand and scrape hides, but it would be most difficult to haft this sort of tool.

Stemmed Scraper-like Tools

(Fig. 26, No. 9–11, p. 77)

Two whole specimens and two fragmentary specimens of this type were uncovered in Lerma layers. I know of only two similar scrapers from other horizons, Level 6–7 of Tm c 315 and Layer 1 of Tm c 314. All the specimens have a crude, straight, or slightly contracting stem attached to a bulbous body. The specimens are between 38 and 65 mm. long. Most of the stems are between 20 and 25 mm. in width, while the bodies have a maximum diameter of between 40 and 50 mm. In thickness they fall between 3 and 15 mm. *Both the ventral and dorsal surfaces have pressure flaking* and retouching along the edges, thereby making both surfaces slightly convex. From this standpoint, these implements are different from the tools usually called scrapers, which have a straight or concave ventral surface without flaking scars. Originally, I called these implements small haftable choppers, and they may have been used as such. However, such an implement, if hafted on a long stick and pushed at horizontally-stretched skin at an acute angle (instead of a horizontal pushing), will do a very efficient job of skin scraping (like the blade of a wood plane or the kind of a scraper used by the Athabascans of the Northwest Territories). Superficially, these objects look like the large-stemmed thumbnail scraper so common in the eastern United States (Archaic). Actually, the chipping on two surfaces, the larger size, and its function or method of use make them very different from the Archaic scrapers.

Thin Flake Side-scrapers

(Fig. 26, No. 3, p. 77)

This type, 242 in number, occurred from Nogales to Los Angeles times. One was found in the terra rosa soil just above Floor 4 in Tm c 81 and may be considered a Lerma artifact, but the type, except for this one, seems absent in the two earliest horizons. They all are made from long flat flakes struck from an unprepared core. They have a whole series of shapes, but characteristically have retouching on the dorsal surface along one of their longer edges. In length they range from 20 to 80 mm., in width from 10 to 60 mm., and in thickness are never more than 30 mm.

They occur in large numbers from Nogales to Los Angeles Phase in Tamaulipas and are common over most of North America.

While they could have been used for scraping skins, they also work very efficiently as skinning knives or as all-purpose cutting tools.

Spoke-shaves

(Fig. 26, No. 4, 5, p. 77)

Five spoke-shaves occurred in the Nogales, La Perra, Almagre, and Los Angeles Phases.

All were made from roughly rectangular flakes between 30 and 60 mm. in length, 20 to 40 mm. in width, and from 10 to 25 mm. in thickness. The ventral surfaces are flat, and their dorsal surfaces are raised with irregular chipping on them. Along one of the longer dorsal edges, there is usually a retouched concavity from 4 to 20 mm. deep.

I know of no other specimens from Tamaulipas, though they occur over much of North America.

They could have been used for side-scrapers, but it has been suggested that they were used for woodworking, such as rounding shafts of darts or arrows.

Gouges

(Fig. 27, No. 6–8, p. 80)

About two hundred were examined; thirty-six occurred in excavation. These gouges are roughly triangular in shape with convex edges and a concave base. They range between 50 and 90 mm. in length, 30 and 70 mm. in width, and 5 to 35 mm. in thickness. The ventral surfaces are relatively flat with a few percussion flakes, while the dorsal surfaces range from convex to keeled. Percussion flaking and retouching are usually found only on the dorsal surfaces adjacent to the concave bases.

These tools are found only in the Almagre, La Perra, and Nogales Phases of the Sierra de Tamaulipas. In northern Tamaulipas they occur in the Falcon Dam,[88] Nogales, Repelo, and Abasolo Complexes.[89] In Texas, similar gouges are to be found in the Abilene,[90] Round Rock,[91] Oso,[92] Coahuiltecan,[93] and Clear Fork [94] artifact Complexes. In the Valley of Mexico some of the beaked scrapers assigned to the Chalco complex are gouges,[95] and one of the tools that Aveleyra found with the mammoth near Tepexpan was a gouge.[96]

Large Disk Scrapers

(Fig. 27, No. 3–5, p. 80)

Over two hundred were examined; fifty-six were found in excavation. These scrapers, in the Sierra de Tamaulipas, are round, and range between 25 and 80 mm. in diameter, with an average diameter of about 40 mm. The ventral sides of all, formed by one to five percussion blows, are straight or slightly concave, while the dorsal sides are convex (ranging in thickness from 8 to 25 mm.) with numerous percussion- and a few pressure-flaking scars. Between 20 and 60 per cent of the dorsal edge is retouched to give a scraping edge.

Temporally in the Canyon Diablo, disk scrapers are almost all confined to the Nogales, La Perra, and Almagre horizons, and the few cases in the caves where they were found in later levels I believe are due to aboriginal mixing, not later use of this type.

They also occur in Nogales, Abasolo, Repelo,[97] and Falcon Dam sites [98] north of the Soto la Marina River. They are widespread in early horizons, occurring in the early cultures of southern California,[99] Nevada (Gypsum Cave),[100] southern Arizona (Ventana Cave),[101] New Mexico (Clovis),[102] the Trans-Pecos region, Texas,[103] and in Mexico in San Luis Potosí [104] and the Valley of Mexico (Chalco).[105]

Pebble Skin-smoothers

(Fig. 27, No. 1–2, p. 80)

Most of those eight from excavation are roughly oval or round in outline, being between 50 and 100 mm. in diameter and from 15 to 50 mm. thick. All are split from pebbles or large round cores. Their convex dorsal surfaces may have a few percussion scars, or these may be entirely absent. The flat ventral surfaces always have numerous percussion flaking scars and usually a series of pressure flakes along their edges. Sometimes the dorsal edges also have evidence of chipping, and thus the extremities are more or less rounded and do not have a sharp cutting edge.

Six of these were uncovered in La Perra layers, one in a Nogales, and one in an Almagre layer; twenty were collected from Repelo sites, and one from an Abasolo site. I suspect that they are fairly common in sites in northern Tamaulipas and even Texas, but have often not been recognized as artifacts.

I believe that this type of implement was used as an abrader or skin-smoother on a tightly-stretched skin after the fatty tissues had been removed by scraping. Similar abraders or skin-smoothers of sandstone or split pebbles are used by the Loucheux [106] and Slaves of the Northwest Territories to smooth skins after soaking the skins. It makes for a fine smooth surface.

[88] Aveleyra, 1951; R. L. Stevenson, 1951: pl. VII.
[89] *See* pp. 178–183.
[90] J. C. Kelley, personal communication.
[91] *Ibid.*
[92] Gladwin, 1937: pl. III, *b*.
[93] Gladwin, 1937: pl. IV, *a*.
[94] Gladwin: pl. II, *a*.
[95] de Terra, 1949: pl. 12, *f*.
[96] Aveleyra and Maldonado, 1953: fig. 105, no. 4.
[97] *See* pp. 178–183.
[98] Suhm and Krieger, 1954.
[99] Rogers, 1939.
[100] Harrington, 1933.
[101] Haury, 1950.
[102] Sellards, 1953.
[103] Kelley, Campbell, and Lehmer, 1940: 26.
[104] de Terra, 1949: pl. 18, H.
[105] de Terra, 1949: pl. 14, D, E.
[106] Douglas Leechman, personal communication.

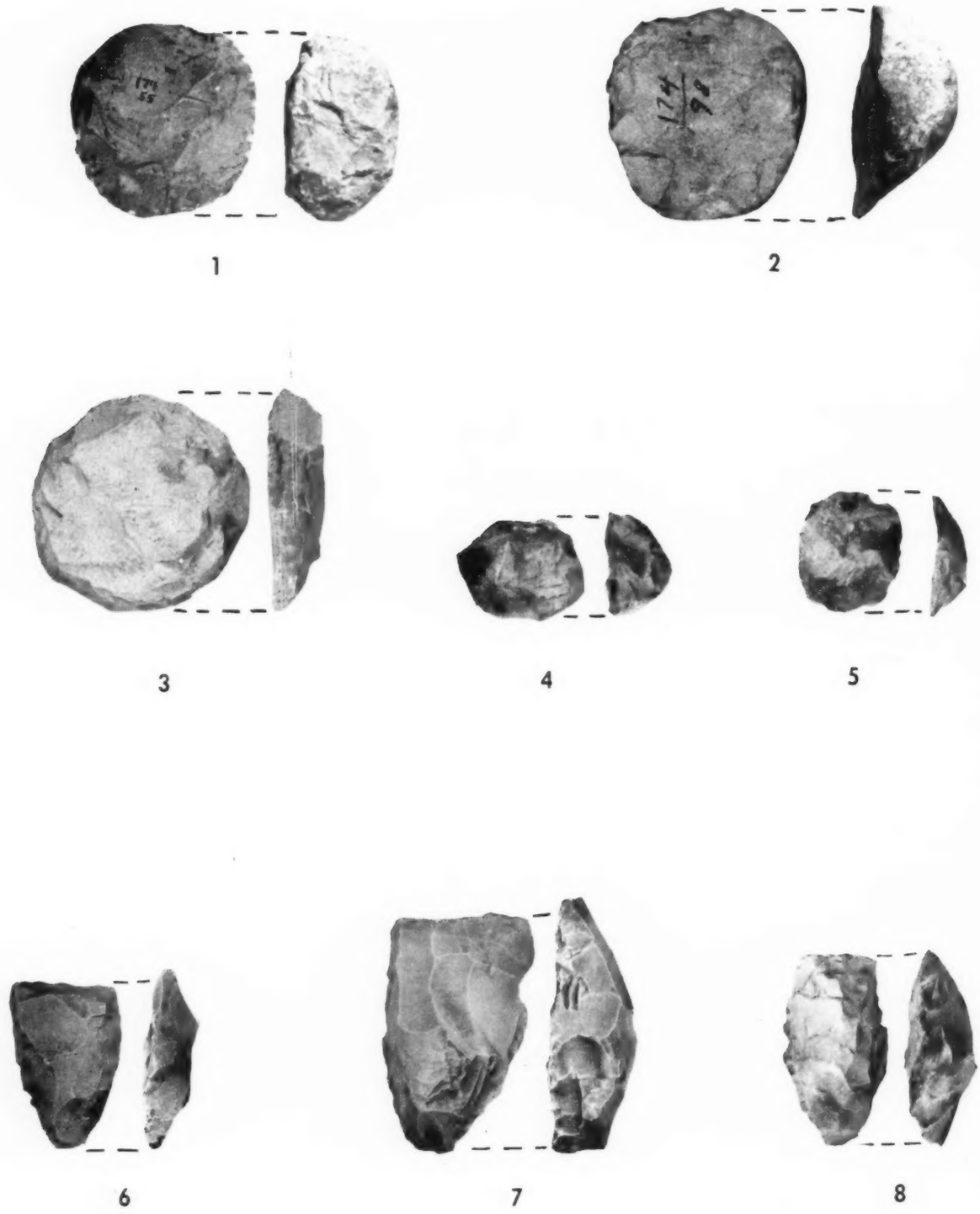


FIG. 27. Scraper types (1/2 natural size) (top and side views). 1–2. Pebble skin-smoothers. 3–5. Large disk scrapers. 6–8. Gouges.

Keeled Teardrop End-scrapers

(Fig. 28, No. 12–14, p. 82)

Forty-three of these occurred in excavation in the Sierra de Tamaulipas, and I have seen about twenty more from other parts of that state.

In general outline they are roughly teardrop-shaped. Their ventral surfaces are flat or concave, often with a bulb of percussion at the widest part of the point and near the cutting edge. Their dorsal surfaces usually have a ridge with some rough pressure flaking from the ridge to the lateral edges. The end or cutting edge is usually steeply retouched by pressure flaking. Occasionally the opposite end is retouched to a point. In size they range from 58 to 90 mm. in length, from 12 to 25 mm. in maximum thickness, and from 33 to 56 mm. in maximum width.

As far as Tamaulipas is concerned, this type of scraper is confined to the Almagre horizon. A few have been found over the rest of Tamaulipas and Texas.

The pointed proximal end suggests that they were inserted into handles for scraping or fleshing a skin.

Crude Lamellar Flakes

(Fig. 28, No. 7–9, p. 82)

Twenty-eight were recovered from excavations in Tamaulipas, and they are fairly common in the rest of Tamaulipas.

These are roughly rectangular or oblong in outline. They have a flat to slightly convex ventral surface with a bulb of percussion at one end. The dorsal surface has one to three irregular ridges running the length. Occasionally the lateral edges show evidence of use, and one is actually retouched. In length they range from 35 to 80 mm. In width they are between 6 and 16 mm., and their maximum thickness is usually about 4 mm. Generally speaking, they are slightly thicker at the end with the bulb of percussion than at the opposite end. This makes me suspect that they were struck from crude conical polyhedral cores (like those found in Almagre layers) which had the striking platform at an acute angle to the lateral fluting.

In Tamaulipas these first appeared in the Almagre horizon and continued up through Los Angeles times. They are found over most of Tamaulipas in relatively late horizons, as they do over much of Mexico and the rest of North America.

It has been suggested that they were inserted into handles to function as side-blades, but some of those with working along both lateral edges certainly were used as all-purpose cutting tools or scrapers.

Rectangular Lamellar Flakes

(Fig. 28, No. 10, 11, p. 82)

Twenty were found in the Sierra de Tamaulipas with the Laguna, Eslabones, and La Salta Phases. All are of obsidian and roughly rectangular in outline, between 12 and 75 mm. long, 8 and 15 mm. wide, and about 2 mm. thick. Each has one side always flat or slightly concave, and three show bulbs of percussion. The opposite side usually has a central flat plane with parallel planes on either side that slope down to the edges. These flakes were undoubtedly struck from long conical or cylindrical polyhedral prepared cores with the striking platform at right angles to the fluting. Since no cores or even very many obsidian chips were found in excavated deposits, I suspect these tools were not manufactured in the Sierra de Tamaulipas.

Blades such as these are present in all periods in Meso-America,[107] and one was found associated with the Tepexpan mammoth.[108] While they occur elsewhere in North America, Tamaulipas appears to be the northernmost point of their distribution in Mexico.

There is ample evidence from Mexico to indicate that such lamellar flakes were used as side-blades in clubs and knives.

Polyhedral Cores

Three fragments of fluted cores occurred in Levels 6–7 of Tm c 315. The more complete one was roughly conical. It was 64 mm. in diameter, 42 mm. deep and bears seven parallel flutes about 12 mm. wide along one side at a 45-degree angle to its striking platform. Crude lamellar flakes came from this type of core.

Pointed Prismatic Flake Knives or Scrapers

(Fig. 28, No. 1–3, p. 82)

These long prismatic or truncated flakes have evidently been struck off a prepared cylindrical or conical core. In length they fall between 52 and 90 mm. long, and between 12 and 20 mm. wide. They are always less than 5 mm. thick. Usually one end is rounded or squared while the other is somewhat pointed. A few have fine retouching along one or two of the longer edges or on one surface, but many do not have this feature. Twelve scrapers are confined to Los Angeles levels or sites and about thirty more were examined.

They may have been used as side- and end-blades inserted into a handle.

Flake End-scrapers

(Fig. 28, No. 4–5, p. 82)

These scrapers are roughly triangular or oblong in shape, being about 30 mm. long and 20 mm. wide. They are usually made from thin flakes and have one of the shorter steeper sides retouched. Only about eleven were examined, and all were associated with Los Angeles pottery and in stratigraphically late levels. They were probably inserted into a handle for scraping.

[107] Kidder, 1947.

[108] Aveleyra and Maldonado, 1953.

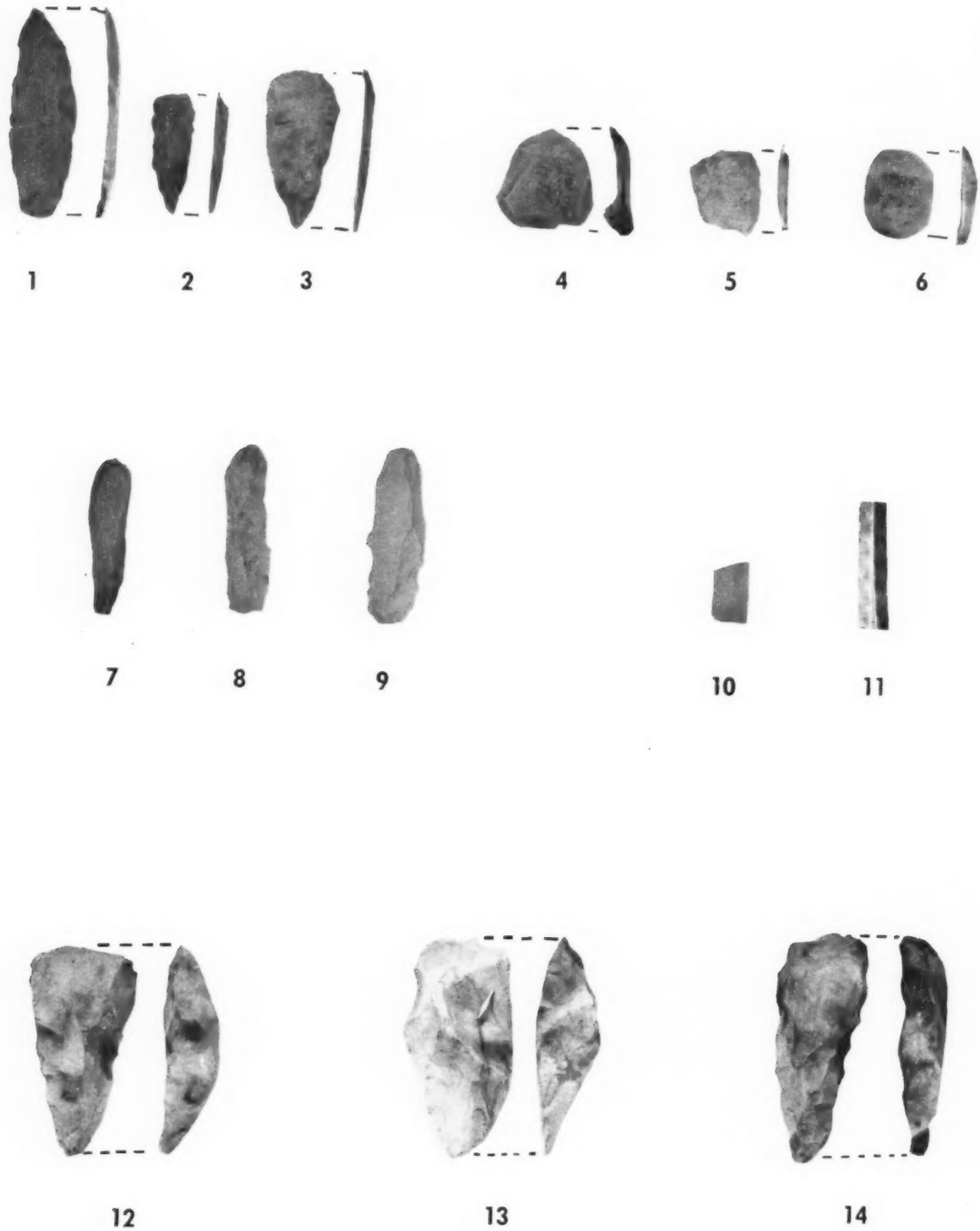


FIG. 28. Scraper types (1/2 natural size) (top and side view). 1–3. Pointed prismatic flake-knives or scrapers. 4–5. Flake end-scrapers. 6. Small disk scrapers. 7–9. Crude lamellar flakes (top view only). 10–11. Rectangular lamellar flakes (top view only). 12–14. Keeled teardrop end-scrapers.

TABLE 5

DISTRIBUTION OF BIFACIAL TOOLS IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components Surface components	Total	Bifacial Fragments	Ovoid Crude Bifaces	Bifacial Chipped Choppers	Semi-lunar Chipped Blades	Graver or Perforator	Square Based Bifacial Blades	Pebble Hammerstone	Small Chipped Disk	Large Chipped Disk	Battered Nodules	Square Poll Ground Celt	Pointed Poll Ground Celt	Finely-chipped Triangular Knives	Finely-chipped Ovoid Knives	Finely-chipped Small Bifacial Disk
Los Angeles	Tm c 81, layer 1	32	27	1	1										2	1	
	Tm c 82, layer 1	31	13	1				2	7	1					4	3	
	Tm c 82, layer 2	33	12	7	1			1	5	1	1	2			1	2	
	Tm c 326	1		1													
	Tm c 320	1			1												
	Tm c 83, levels 2–3	1													1		
	Tm c 314, layer 1	32	17	11				2		1							1
	Total Los Angeles bifaces	131	69	21	3			5	12	3	1	2			8	6	1
	Percentages of Los Angeles Types			.34	.05			.08	.19	.05	.02	.03			.13	.09	.02
La Salta	Tm r 78, level 1	1												1			
	Tm c 314, layer 2	3	2	1													
	Tm c 323	3		2					1								
	Total La Salta bifaces	7	2	3					1					1			
	Percentages of La Salta Types			60					.20					.20			
Eslabones	Tm c 311a	2		2													
	Tm r 6, levels 1–3	6							2					1	1	2	
	Tm c 81, layer 2	34	28	2	1				2	1							
	Tm c 82, layer 3	22	5	5					8		3	1					
	Total Eslabones bifaces	64	33	9	1				12	1	3	1		1	1	2	
	Percentages of Eslabones Types			.29	.03				.39	.03	.10	.03		.03	.03	.07	
Laguna	Tm r 88, level 1	2														1	1
	Tm r 328	2		1									1				
	Tm r 195	5			4			1									
	Tm r 194	2		2													
	Tm r 324	14	5	8													1
	Tm r 172, levels 1–4	14		6					2				1	2	2	1	
	Tm r 174, layer 1	20	10	2					3	2	1	1				1	
	Total Laguna bifaces	59	15	19	4			1	5	2	1	1	2	2	2	3	2
	Percentages of Laguna Types			.43	.09			.02	.11	.05	.02	.02	.05	.05	.05	.07	.05
Almagre	Tm c 175	1			1												
	Tm c 82, layer 4	25	9	5				2	1	1	4	3					
	Tm c 315, level 5	29	4	9	2			6		3	5						
	Tm c 315, levels 6–7	44	11	10	4			3	3	3	10						
	Tm c 339	6	1	5													
	Tm c 314, layer 3	2	1	1													
	Total Almagre bifaces	107	26	30	7			11	4	7	19	3					
	Percentages of Almagre Types			.37	.09			.13	.05	.09	.23	.04					
Mixed	Tm c 315, levels 1–4	112	44	46	7			9	1	3	2						
La Perra	Tm c 315, levels 8–9	11	2	1				1	2	2	3						
	Tm c 174, layer 2	25	7	1	1			1	6	1	4	4					
	Tm c 174, layer 3	7	3	1				1			1	1					
	Tm c 82, layer 5	38	14	6	1				3	2	3	9					
	Tm c 189	2								1	1						
	Total La Perra bifaces	83	26	9	2			3	11	6	12	14					
	Percentages of La Perra Types			.16	.03			.05	.19	.11	.21	.25					
Nogales	Tm c 290a	9		7				1		1							
	Tm c 82, layer 6	25	10	8		1			1	2	2	1					
	Tm c 81, layer 3	23	6	6					4	6	1						
	Tm c 314, layer 4	2		1						1							
	Tm c 313	1			1												
	Tm c 82, layer 7	27	10	4	2		1	1	5	4							
	Total Nogales bifaces	87	26	26	3	1	1	2	10	14	3	1					
	Percentages of Nogales Types			.43	.04	.02	.02	.03	.17	.23	.04	.02					
Mixed	Tm c 174, layer 4	7	3	2		1	1										
	Tm c 81, layer 4	13	8	4					1								
Lerma	Tm c 305	1			1												
	Tm c 174, layer 5	12	6	2	2			1	1								
	Tm c 174, layer 6	13	5	3	1		1	2	1								
	Tm c 81, layer 5	26	11	4	3	2	2	3	1								
	Total Lerma bifaces	52	22	9	7	2	3	6	3								
	Percentages of Lerma Types			.30	.23	.07	.10	.20	.10								
Diablo	Tm c 81, layer 6	8	2	4	2												
	Grand Total of Bifaces	730	276	182	36	4	5	37	60	36	41	22	2	4	11	11	3

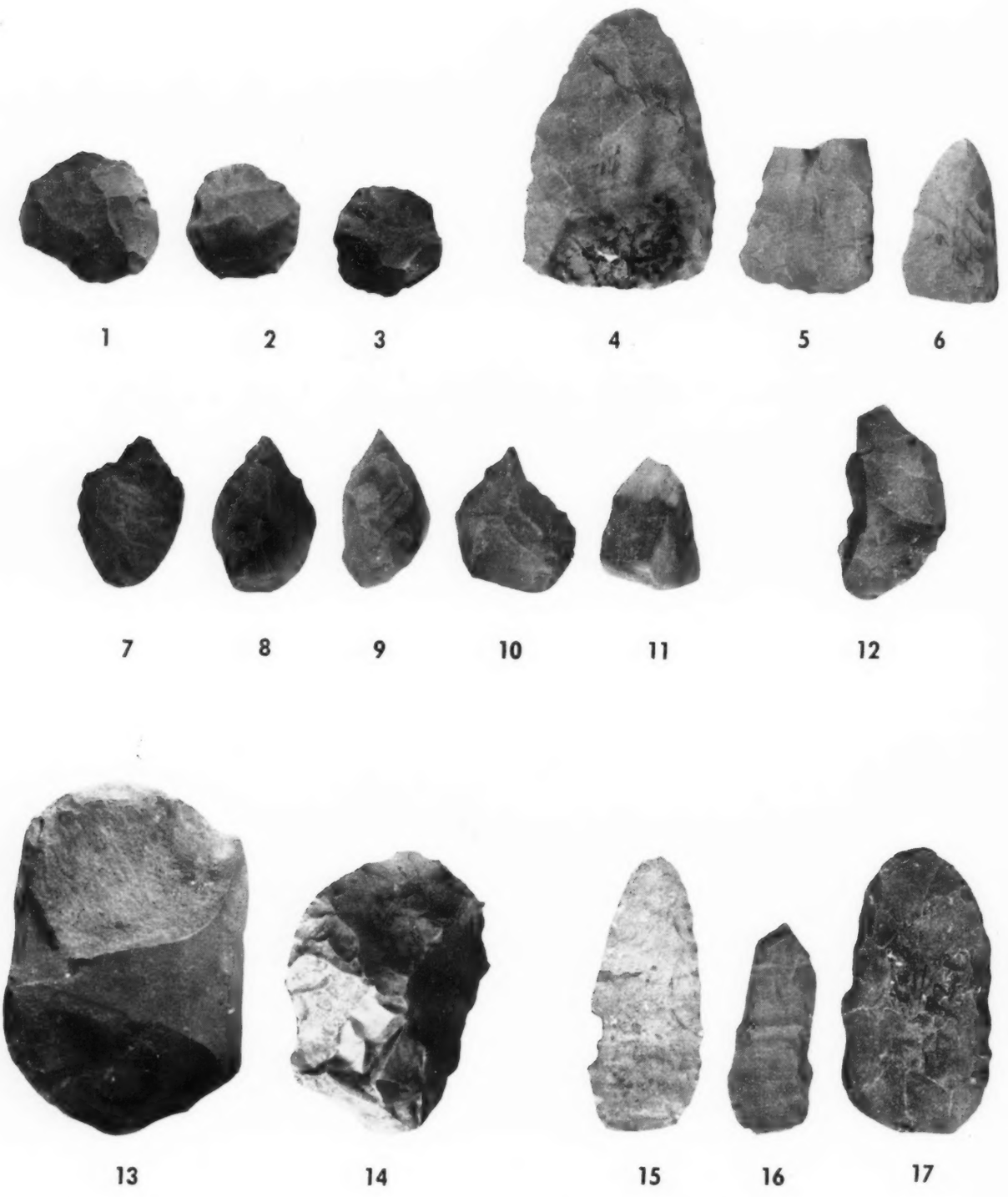


FIG. 29. Biface types (1/2 natural size). 1–3. Small chipped disks. 4–6. Square-based bifaces. 7–11. Gravers. 12. Semi-lunar chipped blade. 13–14. Choppers. 15–17. Ovoid bifaces.

Small Disk Scrapers

(Fig. 28, No. 6, p. 82)

Only one occurred in Layer 1 of Tm c 314 in the Sierra de Tamaulipas, but they are common on the Gulf Coast in the Catan, Barril, Brownsville, and Huastec Complexes.[109] This description is based on the total of the type and not on the one specimen from the Sierra de Tamaulipas.

Scrapers of this type are oblong to circular in outline (from 10 to 25 mm. in diameter) and have a flat to concave ventral surface, having steep retouching on the dorsal surface leading either to a dome or to a flat section. They range from 3 to 9 mm. in thickness.

In Tamaulipas this scraper type seems confined to late prehistoric times. Its wider distribution is unknown.

These disks probably were inserted into handles to serve for scraping skins, wood, or bone marrow.

3. BIFACES

Included in this group are 730 tools that are bifacially chipped or bifacially ground. These tools had various uses and forms. But they had one function in common, that is, all were used percussively against another object (except possibly the drills and gravers). In terms of sequence there is a general tendency for the bifaces in the earlier periods to be larger and more poorly chipped and in the later periods to be smaller and either more finely chipped or to be ground. Although new kinds of percussive tools appear with almost every horizon, the older ones seem to carry on into later horizons. Unlike most scrapers and projectile points, they are not apt to die out within a few periods.

In the actual sequence, the Diablo Complex has bifaces ovoid in outline, fragments of bifaces, and choppers. All of these tools carry on into the later phases. The Lerma Phase sees the introduction of semi-lunar bifaces and gravers. These do not carry on into any of the later horizons and are distinctive of the phase. Square-based bifacial blades and pebble hammerstones also appear at this time, but these seem to carry through.

Though having many of the older artifact types, the Nogales horizon sees the introduction of small bifacially chipped disks. These continue on into later horizons. Near the end of this phase large chipped disks and battered nodules appear. Both of these tools, however, are much more common in the La Perra horizon, with the large chipped disks lasting into Almagre times.

The Almagre Phase has crude polyhedral cores with a striking platform at an acute angle to the fluting as its only diagnostic biface trait.

Laguna, Eslabones, and La Salta have polished celts with square or pointed bases. These are unique to these horizons. The rectangular lamellar flakes from these three phases were probably struck from cylindrical polyhedral cores with the striking platform at right angles to the fluted surface, even though we found none in excavation. Also present in these three horizons are finely-chipped triangular and ovoid bifaces. Both of these are much more common in the final Los Angeles Phase. The Los Angeles Phase itself has few new types of bifaces and sees the continuation of many of the older types. A single small chipped disk, about the size of a penny, seems to be the only new trait occurring at this time and even it may be aberrant.

In terms of actual use, all horizons produced bifaces that were unhafted, such as choppers and gravers, hammerstones, large and small chipped disks, and battered nodules. From Lerma times on, these were accompanied by bifaces that were end-hafted, such as square-based blades and the more finely chipped semi-lunar ones. Gum on the base of a few of these indicates they were set into the slots at the end of handles, and the slots probably then closed against their surfaces by binding below the blade. The only real different mode of hafting occurs during the periods with ruins when we find celts that were undoubtedly side-hafted into split sticks.

Ovoid Bifaces

(Fig. 29, No. 15–17, p. 84)

The 182 bifaces of this type occur in all horizons. These are large with a round base, convex sides, and abruptly-sloping point. In length they range between 60 and 140 mm., and in width between 40 and 70 mm. In thickness they vary between 8 and 15 mm. The surface and the shape seem to have been formed by percussion flaking. Many are so crude as to suggest they are in reality prepared blanks from which artifacts might be made, while others seem to be actually large knives or daggers. The latter may or may not have been hafted. There is a very slight tendency for the thicker (blank-like) ones to be in the earlier horizons, but the statistics on such a difference did not justify establishing two types of bifaces.

Choppers

(Fig. 29, No. 13–14, p. 84)

Thirty-six occurred. There appear to be two varieties of choppers. One variety is small, made of a bulbous bifaced core about 80 mm. in diameter and 35 mm. thick, with retouching or fine flaking made by use along one sharp edge. The other variety is made from large flakes (often roughly rectangular) struck from pebbles or large chunks of chalcedony. All of this variety are between 70 and 150 mm. long, about

[109] *See* pp. 164–192.

the same in width, and about 25 mm. thick. The thickest part is usually near the apex of the triangle (being a bulb of percussion); the side or edge opposite usually bears either percussion or pressure flaking on one or both of its surfaces. On the basis of the present data, these two varieties have about the same distribution in time and space, and separating them into two types is not justified. Generally speaking, choppers are popular in the Lerma and Diablo components; they appear to be on the wane and little used in Nogales, Almagre, and La Perra times. In northern Tamaulipas they occur in all but the latest horizons.

Gravers (or Drill-like Implements)

(Fig. 29, No. 7–11, p. 84)

Gravers (five) appear to be confined to the Lerma horizon, though one appeared in the earliest Nogales component, Tm c 82, Layer 7, and one was in Tm c 174, Layer 4, a mixed Lerma–La Perra Layer. In northern Tamaulipas they are equally rare, though a few were found in Nogales, Repelo, and Abasolo sites. Three of the gravers have round, well-chipped bodies (looking almost as if they came from re-chipped broken ovoid blades) with a short tapering small point on one edge. The bodies are about 40 mm. in diameter, 15 mm. thick, and the points are between 6 and 12 mm. long. The other two gravers appear to have been made from fragments of chipped angular pebbles and have points 3 to 6 mm. long at the ends of tapering bodies.

Square-based Bifaces

(Fig. 29, No. 4–6, p. 84)

These bifaces have straight or slightly convex bases; the sides taper to an abrupt point and are slightly convex. In size they range between 65 and 120 mm. in length, 40 and 70 mm. in width, and 5 and 20 mm. in thickness, but most of them fall within the smaller limits of the dimensions. This type occurs mainly in the Lerma levels, though it is present in significant amounts in the Los Angeles components and is present in all Almagre and La Perra levels. North of the Sierra de Tamaulipas they occur at the Nogales, Repelo, and Abasolo sites, and both Aveleyra [110] and Stevenson [111] found them in some abundance in the Falcon Dam area.

Such tools were probably knife or dagger blades and probably, since gum appears on the base of a number of specimens, they were end-hafted.

Semi-lunar Chipped Blades

(Fig. 29, No. 12, p. 84)

Two of these were found, both in Layer 5 of Tm c 81. Both are about 80 mm. long, 30 mm. wide, and 8 mm. thick. Each has a straight side, a convex side, and pointed ends. They bear percussion flaking on both surfaces, pressure flaking along all edges, and fine retouching along the convex edge. Since they occurred mainly at Tm c 81, I do not know whether they are diagnostic of the Lerma Phase or merely aberrant ovoid blades. However, when more Lerma sites are dug, it is possible they will turn out to be a significant trait.

Pebble Hammerstones

Fifty-seven of these were recovered from excavations. They occurred in all horizons except Diablo and are mainly elongate pebbles, common the world over, from 50 to 200 mm. in length and 20 to 100 mm. in diameter that show pecking on one or both ends.

Small Chipped Disks

(Fig. 29, No. 1–3, p. 84)

Thirty-six of these were uncovered. They range in diameter from 23 to 50 mm. (with an average of 40 mm.), and in maximum thickness from 8 to 15 mm. Both surfaces are roughly convex and bear percussion flaking, while the edges are sharp and bear retouching and sometimes wear flakings or blunting. Most are fairly crudely made, but a few are fine thin disks with a great deal of pressure flaking along their edges.

Small chipped disks are very prevalent in Nogales components and still are present in most La Perra and Almagre levels, but after that time they occur only in insignificant amounts. North of the Sierra de Tamaulipas they appear in Nogales components and in some of the sites in the Falcon Dam area,[112] but are absent from Repelo and Abasolo sites.

Their exact function is at present unknown, but they might have been some sort of small chopping tool or quarry blank.

Large Chipped Disks

(Fig. 30, No. 9–10, p. 87)

These forty-one chipped disks are roughly oval in outline with diameters ranging from 50 to 110 mm. Generally speaking, they have rather flat surfaces and are between 10 and 40 mm. thick. All of them are made from flat roundish river pebbles or from large flakes struck from pebbles.

The flat surfaces of these disks usually have only one or two large scars, but along their edges on both sides numerous small flakes have been removed by percussion. Most of the specimens show one or more parts of these edges to be dulled and blunted by use, and for this reason I suspect these disks were used as choppers.

Temporally these choppers are confined to the La Perra and Almagre horizons with the exception of a

[110] Aveleyra, 1951.
[111] Stevenson, 1951.
[112] *Ibid.*

FIG. 30. Biface types (1/2 natural size). 1. Finely-chipped small disks. 2. Finely-chipped ovoid knife. 3. Finely-chipped triangular knife. 4. Square poll celt. 5. Pointed poll adze (celt?). 6. Pointed poll celt. 7–8. Battered nodules. 9–10. Large chipped disks.

few that occur with Nogales material north of the Soto la Marina River.

Battered Nodules

(Fig. 30, No. 7–8, p. 87)

Chipped or battered, more or less spherical flint or limestone nodules were found throughout La Perra levels. They range from roughly 50 to 90 mm. in diameter. A few show battering or blunting on one portion of their surface. I suspect they were some sort of hammerstone.

Tools such as these are prevalent in the La Perra horizon, while a few occur in both Nogales and Almagre horizons.

Pointed Poll Celt

(Fig. 30, No. 5–6, p. 87)

Pointed poll celts occur in Laguna, Eslabones, and La Salta components. They range from 60 to 200 mm. in length, from 40 to 70 mm. in width at the bit, and from 15 to 34 mm. in maximum thickness. They are polished, and the convexity on each surface is about equal.

They were probably hafted to split sticks with the cutting edge parallel to the long axis of the handle (like an axe).

Square Poll Celt

(Fig. 30, No. 4, p. 87)

One occurred on the surface of the Laguna site. It was 230 mm. long, 50 mm. wide at the bit, and has a maximum thickness near the poll of 46 mm. It is elliptical in cross-section with the cutting edge equidistant between the surfaces. Its surfaces are polished.

It was probably hafted on a split stick, like an axe.

Finely-chipped Triangular Knives

(Fig. 30, No. 3, p. 87)

Eight were associated with Los Angeles levels or sites. They also seem to have been fairly common in Laguna, Eslabones, and La Salta sites and represent a possible link between the two cultures. In length these are between 40 and 90 mm., and in width between 20 and 40 mm. They are usually less than 6 mm. in thickness. In shape they have a straight or very slightly convex base, convex edges, and a long tapering point. Both surfaces usually have resolved pressure flaking, and the edges have fine retouching. Many of these look like large, well-made Nogales or Tortugas Triangular points, or smaller, better-made square-based knives. All three of these related kinds of implements appear in some Los Angeles levels and may very well have served as blades for daggers.

Finely-chipped Ovoid Knives

(Fig. 30, No. 2, p. 87)

These appear in Los Angeles and in Laguna, Eslabones, and La Salta levels. The average is about 90 mm. in length and about 45 mm. in width; they range between 3 and 8 mm. in thickness. All have rounded bases, convex edges, and either pointed or rounded ends. Most of them have fine pressure flaking on both surfaces and retouching along their edges. They look like refined editions of the ovoid blades found so commonly in the earlier levels or like well-made large Abasolo Round-base points.

Finely-chipped Small Disks

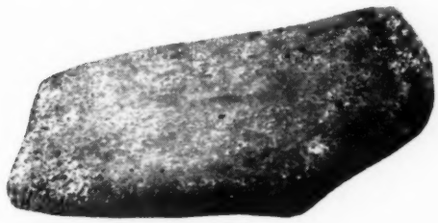
(Fig. 30, No. 1, p. 87)

These appeared mainly in Los Angeles levels. The average is about 25 mm. in diameter and about 5 mm. thick. They are usually made from a flat flake which has been made round in outline by pressure flaking on both its surfaces along the edges.

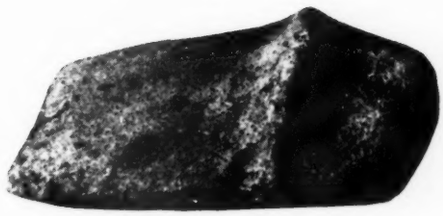
4. GROUND STONE

In the Sierra de Tamaulipas we identified *227* ground stone objects, all implements of food preparation. These objects did not occur in all components and when present were few in number. Most of those found in excavation were carefully recorded, but here again, because of the general similarity of the flat slabs that had fallen from the cave roof, some questionable specimens were finally discarded. Our counts of ones from survey are even poorer. This was probably due to two reasons. First of all, complete ones were too large, too bulky, and too heavy to carry back to the laboratory from the field survey; and secondly, fragments of these tools often looked like ordinary rocks, which are found in plenty on open sites, and therefore not noted or counted.

In spite of these deficiencies and a relatively small sample, there is a good sequence of types of these food-preparing objects. The Nogales horizon saw their first appearance. Large stone mortars and pebble manos occurred at that time. The La Perra and Almagre horizons saw the occurrence of many more pebble manos and mortars as well as the introduction of mullers. The Laguna horizon, as well as the Eslabones and La Salta Phases, had an almost complete new set of these ground tools. Only the mortars carried over in significant amounts, and even these were larger and better made. New to these horizons are bell-shaped pestles. The mullers of previous horizons seem to be replaced by angled-back metates. Pebble manos give way to rectangular or cylindrical manos. These new types of manos differ not only in form but in the way they were used. As they are large, one would have had to use both hands for grinding. Abrasions on them reveal also that they were always used with a back-and-forth



1



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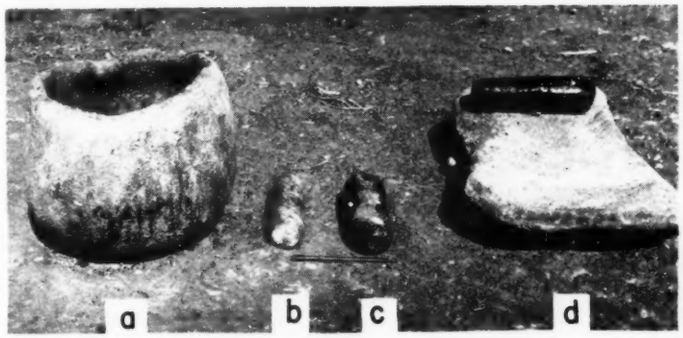

3

FIG. 31. Grinding stones (about 1/10 natural size). 1. Top view of angled-back metate. 2. Bottom view of angled-back metate. 3 (*a*) Mortar. (*b*) Cylindrical mano. (*c*) Cylindrical mano. (*d*) Rectangular metate.

movement and never round-and-round like the pebble manos. Also occurring in these horizons are the so-called bark-beaters. The final phase of the Sierra de Tamaulipas, Los Angeles, has all the older types, except bark-beaters, with rectangular metates and whetstones as significant additions.

A comparison of the proportions of these ground stone tools to other stone tools reveals three general periods. Nogales, La Perra, and Almagre have only a few (6 to 9 per cent). Laguna, Eslabones, and La Salta have proportionally many more (27 to 30 per cent), and the Los Angeles Phase sees a definite decrease, as only about 14 per cent occur.

These food-preparing tools and the actual foodstuffs in the La Perra, Laguna, and Los Angeles horizons, plus comparative data, lead to a number of possible interpretations. In caves of southwestern Tamaulipas mortars appear in the Infiernillo and Ocampo Phases where there is no evidence of corn agriculture but abundant remains of wild foodstuffs. Thus mortars seem to be correlated with plant collecting and the preparation of wild foodstuffs. Turning now to the Sierra de Tamaulipas, in the Lerma and Diablo horizons, without mortars, there may have been little or no plant collecting or, if there was, these wild foodstuffs were prepared without the use of mortars. As mortars are always present from Nogales times onward, plant collecting seems to have become important from that period, at least.

Mullers and pebble manos are found in greatest abundance in the La Perra horizon where there is evidence of incipient corn agriculture as well as plant collecting. In southwestern Tamaulipas the Flacco and Guerra horizons with incipient corn agriculture and abundant

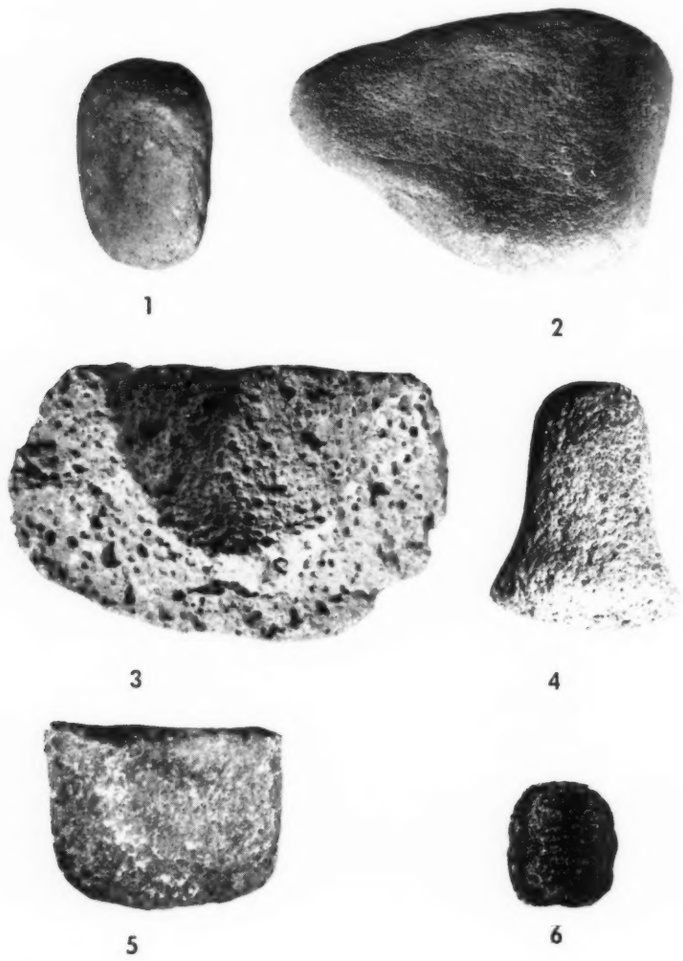

FIG. 32. Ground stone (1/2 natural size). 1. Pebble mano. 2. Boulder muller. 3. Mortar. 4. Bell-shaped pestle. 5. Rectangular mano. 6. Bark-beater.

evidence of plant collecting reveal the same large proportion of pebble manos and crude mullers. Thus there seems to be a correlation between incipient agriculture with wild plant-stuffs and mullers and pebble manos. In both areas a few pebble manos and mullers appear before any agriculture. Perhaps these tools were involved in a technique that was used first by the Nogales peoples on wild food plants and then readapted by the Almagre and La Perra people to the preparation of corn and squash seeds.

As has been stated previously, the Laguna horizon sees a whole new set of ground stone tools. Inferentially, this certainly must mean the introduction of a new set of techniques for preparing agricultural products. The angled-back metate and the cylindrical and rectangular manos could have been used for grinding *nixtamel*, a lime-soaked corn, into *masa*, the dough from which *tortillas*, *atole*, and other maize foods are made. The back-and-forth movement used with the manos would have produced, as it does today, a fine-textured *masa* for tortillas. The circular motion used with the mullers of the earlier periods probably would not have ground the dough sufficiently fine to make a good *masa*.

The occurrence of bell-shaped pestles in the Sierra de Tamaulipas at Laguna times possibly indicates the use of a new food. Associated with the bell-shaped pestles are molcajetes. In modern Mexico the molcajetes with the bell-shaped pestle are used for grinding *chili*. Unfortunately, in the Sierra de Tamaulipas in the preserved cave remains we found no *chili*. However, in southwestern Tamaulipas, molcajetes, bell-shaped pestles, and *chili* occurred together. Therefore, it is possible that the appearance of molcajetes with bell-shaped pestles in Laguna times represents the introduction of *chili* as a food and condiment, which continued up through the Los Angeles horizon.

Now we come to the Los Angeles horizon with its

wide variety of food-preparing tools. Actually, there is no evidence of change in the kinds of food prepared. The occurrence of rectangular manos and whetstones, of course, presents a significant change in manufacturing. But how is the continuance of all the older tools to be interpreted? Does it mean a wide variety of manufacturing techniques being used, or does it mean that the Los Angeles people did some archaeological collecting and were using tools that had been made by other peoples at former times? I greatly favor the latter hypothesis. The smallness of the Los Angeles sites, the relative crudity of their artifacts, and the increased amount of hunting, indicated by the bones in Los Angeles levels, do not seem consonant with the manufacture of a large variety of heavy, well-made grinding tools.

Pebble Manos

(Fig. 32, No. 1, p. 90)

Twenty-seven ovoid pebbles from 30 to 100 mm. in diameter were found in excavated levels from Nogales to Los Angeles times. Usually one small portion has a flattened surface from 10 to 50 mm. in diameter, ground smooth. Examination of the scratches and the smooth areas reveal that they were used both in a circular motion as well as a back-and-forth motion. Similar manos occur over most of Tamaulipas.

They were probably used to grind nuts, berries, bone and vegetable matters in the boulder mullers that so often occur in the same levels.

Boulder Mullers

(Fig. 32, No. 2, p. 90)

Twenty-nine whole specimens, or fragments thereof, occurred in the Nogales, La Perra, Almagre, and Los Angeles horizons, while only two occurred in cave excavations of the Laguna and Eslabones Phases, and none were found in ruins of the same culture. Thus I suspect these two specimens may have been dug up by the Laguna peoples in the caves and not actually made by them. These tools vary widely in shape, the majority being roughly round or oval. Two are triangular, and one is oblong. Characteristically they were made from river boulders, but two fragments were made from a piece of limestone, probably from the cave roof. They range in length from 150 to 600 mm., in width from 150 to 300 mm., and in thickness from 36 to 98 mm. A few fragments indicate that there were mullers of much larger proportions, but we found no whole specimens. There is an area of abrasion on one of the flat surfaces of twenty-three of these specimens and on both flat surfaces of three. In most cases this area is merely a polished part of the surface, but in four examples a portion has been ground to a depth of 15 mm. Two specimens revealed a series of curved scratches along the edge of the polished area. These suggest that grinding in these mullers was usually in a circular motion.

Similar mullers occur in northern Tamaulipas in the Repelo and Abasolo Complex.[113] In southwestern Tamaulipas they are present in the Ocampo, Flacco, and Guerra horizons.[114] Undoubtedly various kinds of vegetable and animal matter were ground in these boulders. The fact that but few of these mullers show much wear may mean either that food was not ground very often in them or that the people abandoned their mullers when they moved and made new ones upon re-settling.

Cylindrical Manos

(Fig. 31, No. 3*b,c*, p. 89)

Forty-seven of these manos occurred in components of the Laguna, Eslabones, La Salta, and Los Angeles Phase. As they were extremely common on all ruins, we neither picked up nor counted many hundreds more. All were made from volcanic rock. They are round or oval in cross-section, between 40 and 100 mm. in diameter, and range from 150 to 750 mm. in length. They have either pointed or ovoid ends. (Some of the ones with ovoid ends have also been used as hammers of pestles.) The central sections of these manos are usually polished and worn smooth but are never flat. For this reason I suspect the manos were used in a rocking motion, which is just what one would expect if used in an angled-back metate. Generally speaking, they were probably used in a metate in a back-and- forth motion with the two hands holding each end of the mano.

This type of mano is relatively common in southern Tamaulipas, and a few appear on the surface of sites of Period V or VI in the Huasteca.[115] I know of no similar ones in the rest of prehistoric Mexico.

Mortars

(Fig. 31, No. 3*a*, p. 89 and Fig. 32, No. 3, p. 90)

Twenty-eight fragments of mortars were found in excavation (and I suspect a few more were discarded by my workmen). The mortars are usually made from ellipsoid river boulders or pieces of volcanic tufa. They range in diameter from 100 to 400 mm. and are from 50 to 800 mm. tall. The top side of these mortars usually bears a hollow from 25 to 300 mm. deep. All of them seem to have been fashioned into shape by initially pecking and then grinding. In the pre-pottery horizons there is a general tendency for them to be bowl-shaped and smaller, while in later horizons they are more cylindrical and larger. There is a tendency also for the earlier ones to be from river boulders and the later ones from volcanic tufa. Unfortunately, there is not a one-to-one correlation, as a few from both La

[113] *See* pp. 164–192.
[114] MacNeish, n.d.
[115] Ekholm, 1944.

TABLE 6

DISTRIBUTION OF GROUND STONE TOOLS IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components Surface components	Total	Mortars	Pebble Manos	Boulder Mullers	Bell-shaped Pestles	Angled-back Metate	Cylindrical Manos	Bark Beaters	Rectangular Manos	Rectangular Metate	Whetstone
Los Angeles	Tm c 81, layer 1	8					2	1		2	3	?
	Tm c 82, layer 1	19	1	2	3		3	6		1	3	?
	Tm c 82, layer 2	20	7		1		1	8		1	2	
	Tm c 314, layer 1	2									1	1
	Tm c 326	1				1						
	Tm c 312	2								1	1	
	Tm c 197	1									1	
	Tm c 83, level 1	1									1	
	Total Los Angeles Ground tools	54	8	2	4	1	6	15		5	12	1
	Percentages of Los Angeles Ground Types	1.00	.15	.04	.07	.02	.11	.28		.09	.22	.02
La Salta	Tm r 323	6	2				2			2		
	Tm r 78, level 1, house 1	3					2	1				
	Tm r 78, levels 1–2, house 2	3					1	2				
	Tm r 79, levels 1–2	4					2	2		1		
	Tm r 322	2				1			1			
	Total La Salta Ground tools	19	2			1	7	5	1	3		
	Percentages of La Salta Ground Types	1.00	.11			.06	.38	.28	.06	.11		
Eslabones	Tm r 311a	4	2			1	1					
	Tm r 6, levels 1–3	13				2	5	5	1			
	Tm c 81, layer 2	5		1			3	1				
	Tm r 86, levels 1–3	10					9	1				
	Tm c 82, layer 3	13	4	1	1		1	5		1		
	Total Eslabones Ground tools	45	6	2	1	3	19	12	1	1		
	Percentages of Eslabones Ground Types	1.00	.13	.05	.02	.07	.42	.27	.02	.02		
Laguna	Tm r 223	2						2				
	Tm r 301	3				1	1	1				
	Tm r 88, level 1	6					2	4				
	Tm r 194	4					4					
	Tm r 324	6				1	1	2	1	1		
	Tm r 172, levels 1–4	22	4			2	8	4	2	2		
	Tm r 174, layer 1	4		1	1			2				
	Total Laguna Ground tools	47	4	1	1	4	16	15	3	3		
	Percentages of Laguna Ground Types	1.00	.09	.02	.02	.09	.34	.32	.06	.06		
Almagre	Tm c 82, layer 4	10	3	2	3			2				
	Tm c 315, level 5	2			2							
	Tm c 315, levels 6–7	12	1	6	5							
	Total Almagre Ground tools	24	4	8	10			2				
	Percentages of Almagre Ground Types	1.00	.17	.33	.42			.08				
Mixed	Tm c 315, levels 1–4	5		2	3							
La Perra	Tm c 315, levels 8–9	4		2	2							
	Tm c 174, layer 2	9	1	3	5							
	Tm c 82, layer 5	6	2	2	2							
	Total La Perra Ground tools	19	3	7	9							
	Percentages of La Perra Ground Types	1.00	.16	.37	.47							
Nogales	Tm c 82, layer 6	6	1	3	2							
	Tm c 81, layer 3	4	2	1	1?							
	Tm c 82, layer 7	3	2	1								
	Tm c 176	1		1								
	Total Nogales Ground tools	14	5	6	3							
	Percentages of Nogales Ground Types	1.00	.36	.43	.21							
	Grand Total of Ground Stone Tools	227	32	28	31	9	48	49	5	12	12	1

Perra and Nogales were large and made from tufa, and at least two from the Eslabones horizon are small and are made from river boulders.

These objects are present not only from Nogales to Los Angeles times but in northern Tamaulipas in the Repelo, Abasolo, and Catan Complex. In the survey of northern Tamaulipas, the local residents showed me many of these *ollas de piedra*.

Nuts, berries, and various other vegetable remains were undoubtedly ground in such basins. They also may have been used to store or soak meal.

Angled-back Metates

(Fig. 31, No. 1, 2, p. 89)

In the Laguna, Eslabones, and La Salta Phases, fragments of metates were very numerous. Metates were all of volcanic rock, and the complete ones ranged from 673 to 1,120 mm. in length and from 200 to 950 mm. in width. In outline they are roughly rectangular. They have horizontal or slightly sloping grinding surfaces twice the length of their steeply-sloping posterior portions. This posterior portion is at an angle of about

45 degrees to the horizontal section. On the basal surface there is a side-to-side ridge opposite the obtuse angle on the upper surface.

This type of metate is common in Mexico, mainly in southern Tamaulipas. Roberto Pavon showed me a few similar ones from the northern Huasteca that he believed came from Zaquil (IV) and Las Flores (V) and Panuco (VI) period sites where they occur with various other types of metates.

I suspect metates such as these were used to grind *nixtamal* into *masa*, though, of course, bones and wild plant materials could have been ground on them also.

Bell-shaped Pestles

(Fig. 32, No. 4, p. 90)

Four of these occurred on the Laguna site and three in the Eslabones Phase and one in both a La Salta and a Los Angeles component. They range from 68 to 92 mm. in length. Only two were whole; they have tapering cylindrical handles and flaring, expanded, pounded, and ground ends, ranging from 44 to 77 mm. in diameter.

Pestles of this type are found in the Huasteca from El Prisco (II) to the Panuco (VI) period.[116] They are common in the rest of Mexico at about the same time.

These could have been used to pound and grind foodstuffs in the mortars. Since they are very similar to modern chili pestles, I suspect they also were used to grind chili in clay molcajetes.

Bark-beaters

(Fig. 32, No. 6, p. 90)

Five fragments of bark-beaters were found on the surface of Tm c 172, Tm r 324, Tm r 6, and Tm r 322, belonging to the Laguna, Eslabones, and La Salta phases. All were 40 to 60 mm. wide, slightly over 50 mm. long, and about 30 mm. thick. The narrow sides show concave surfaces, while the flat tops have a series of parallel grooves on them.

The occurrence in Tamaulipas seems slightly earlier than in the Huasteca [117] but not so early as in the Valley of Mexico.[118]

They are commonly called bark-beaters, and some sort of rope or leather handle may have encircled the lateral grooves, while the incised surfaces were struck against wood or bark. Since we found no evidence of beaten bark in either the preserved remains in the Sierra de Tamaulipas or in the Sierra Madre, I doubt whether this was their function. Like the ones in the Huasteca, those from Tamaulipas show evidence of having the surfaces with the incising ground. Therefore I think they served as some sort of grater.

[116] Ekholm, 1944: 492–493.
[117] Ekholm, 1944: 392–393.
[118] Vaillant, 1930.

Rectangular Manos

(Fig. 32, No. 5, p. 90)

Twelve rectangular manos or fragments thereof occurred in the Laguna, Eslabones, and La Salta Phases and were most common in the Los Angeles Phase. They were all of volcanic tufa. The two whole ones are 148 and 197 mm. long, 70 and 102 mm. wide, and about 2 mm. thick. One of the fragments of rectangular manos from the Eslabones Phase probably was bigger than either of these, but most of the others fall within these ranges in size. They have all been ground into their rectangular form and one or both surfaces bear evidence of considerable grinding. Though the surfaces are quite rough, this grinding seems to have been done in a back-and-forth motion. Manos of this type are common over much of Mexico and were undoubtedly used in the angled-back and rectangular metates.

Rectangular Metates

(Fig. 31, No. 3*d*, p. 89)

Only two whole specimens were found, though ten fragments, some fairly large, occurred in Los Angeles components. The two whole specimens are rectangular, 550 and 722 mm. long, roughly 250 mm. wide, and have a maximum thickness of about 35 mm. They are slightly convex on the lower side and slightly concave on the upper surface. The edges are rounded in counterdistinction to those of the angled-back metates which are squared or sharply angular. They have been ground into shape. Though many of them are made from volcanic tufa, a few are from limestone and one seems to have been made from a fine-grained sandstone.

Metates of this general form occur over a wide area of Mexico and in all periods in the Huasteca. Their distribution in Tamaulipas is, however, of interest, for they occur north of the Soto la Marina River in the Abasolo and Catan horizons as well as in various of the later horizons of the Falcon Dam area.

Both wild and domesticated foodstuffs were undoubtedly ground in this type of metate. As far as Tamaulipas is concerned, the type seems to be earlier to the north among people whom we think of as food-gatherers. Thus I would guess that this type of metate with its simple and general form had a variety of uses.

Whetstones

One small sandstone pebble 60 mm. long and 30 mm. in diameter had a groove about 20 mm. wide and 6 mm. deep ground into it. This I believe was a whetstone, and it occurred in the Los Angeles layer of Tm c 314. On the back rock floor of Tm c 174, Tm c 81, and Tm c 82 caves and on an outcrop of rock at Tm r 6, hollowed out ground areas were found ranging from about 100 to 400 mm. in length, 20 to 400 mm. in width, and 5 to 40 mm. in depth. These probably functioned

TABLE 7

DISTRIBUTION OF BONE AND ANTLER TOOLS IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components	Totals	Antler Flakers	Bird Bone Awls	Antler Piercers	Incised Bone Object
Los Angeles	Tm c 315, layer 1	3		2		1
Almagre	Tm c 315, layer 3	3			3	
	Tm c 314, level 5	1		1		
La Perra	Tm c 174, layer 2	1		1		
	Tm c 174, layer 3	2	1	1		
Nogales	Tm c 81, layer 3	1	1			
	Grand Total of Bone and Antler Tools	11	2	5	3	1

as whetstones and some of them are probably earlier than Los Angeles times. Probably stone tools such as celts, adzes, and the like, as well as bone tools were ground into shape on them.

5. BONE TOOLS

Only eleven fragments of bone tools were uncovered in excavation. The most difficult to identify are two small antler fragments about 14 mm. in diameter, one end of which looks dulled or blunted. I have guessed that these are parts of an antler flaker. One was found in Layer 3 of Tm c 174, a La Perra component, and the other was in the Nogales Layer of Tm c 81. Three fragments of deer antler with their tips polished and worked came from Almagre levels in Tm c 315. These I consider to have been piercers. Part of another doubtful tool, from Layer 1 of Tm c 314, a Los Angeles level, is a fragment of a deer rib, sawed off at one end, which has three incised lines parallel to the sawed portion (fig. 33, no. 17). The other five tools are fragments of bird bone awls from La Perra, Almagre, and Los Angeles layers. They range in size from 46 to 167 mm. in length, are all about 8 mm. in diameter, and have long tapering points. All are made from birds' split leg bones, which have been ground to a point (fig. 33, no. 16, 18).

6. BONE, STONE, SHELL, CLAY, AND COPPER ORNAMENTS

Of the 169 ornaments found, many were of conch shells from the Gulf of Mexico, an indication of contact with coastal regions in the Nogales, La Perra, and Los Angeles Periods, and included effigy beads, disk beads, a conch ladle, tubular beads, and a bar pendant. Stone beads of jade, showing contacts into southern Mexico, appeared in the Laguna and Eslabones Phases, as did a copper ear-spool in the Los Angeles Phase. Marginella beads in the Nogales and Los Angeles Phases, Balimulus shell beads in the La Perra and Almagre horizons, stone canine-tooth-shaped beads in Almagre, clay beads in Laguna and Eslabones, and tubular and disk bone beads in Los Angeles were evidently locally made.

Conch Effigy Beads

(Fig. 33, No. 36, 37, p. 95)

Three of these occurred in the Nogales layer of Tm c 314. In outline they look like a side view of a high-top shoe. They have a pierced ovoid section tangent to a triangular section. The hole drilled from both sides is three-quarters of a millimeter in diameter. They are about 1 mm. thick, about 10 mm. long, and their maximum width is about 5 mm.

I do not know of similar type beads.

Tubular Conch Beads

(Fig. 33, No. 38, 39, p. 95)

The tubular shell beads appeared in a Nogales horizon and in a Los Angeles level. They are made from the columella of a conch shell. They are all roughly 30 mm. in length and 5 mm. in diameter, and have a hole averaging 2 mm. in diameter through them. The hole has been drilled from both ends and is much wider at the extremities of the beads.

In the Huasteca, similar beads occur in the Las Flores (V) period,[119] while in Tamaulipas they are common in Rio Grande delta region in the Barril and Brownsville Complexes.[120]

Shell Disk Beads

(Fig. 33, No. 34, p. 95)

Thirty-eight conch shell disk beads occurred in the Nogales and Los Angeles horizons. These are made from the columella of a conch shell and probably are a cylindrical section that has been cut into thin disks (1 to 3 mm.) and then pierced by drilling from two sides. The holes are always less than 1 mm. in diameter.

These are also common in the Barril and Brownsville Complexes of the Rio Grande delta region.[121]

[119] Ekholm, 1944: 482.
[120] *See* pp. 164–192.
[121] *See* pp. 164–192.

FIG. 33. Ornaments and perishable artifacts (1/2 natural size). 1. Wooden arrow foreshaft. 2. Nut on a stick. 3–5. Cane cigarette butts. 6. Cut cane. 7. Cane flute. 8. Atlatl dart cane mainshaft—distal end. 9. Arrow cane mainshaft. 10–12. Round-ended sticks. 13–14. Sticks whittled to a point. 13. Wooden arrow foreshaft. 16. Bone awl. 17. Incised bone. 18. Bone awl. 19. Leather. 20. Cut gourd. 21. Z-twisted cord of three S-twisted yarns of agave. 22. Z-twisted cord of two S-twisted yarns of agave. 23. Z-twisted cord of two S-twisted yarns of cotton. 24. Granny knot of yucca. 25. Squared knot of yucca. 26. Overhand knot of yucca. 27. Slip loop of yucca. 28. Wound coil of yucca. 29. Marginella bead. 30. Spherical stone bead. 31. Copper ear spool. 32. Clay bead. 33. Snail shell bead. 34. Shell dish bead. 35. Bone dish bead. 36–37. Conch effigy beads. 38–39. Tubular conch-shell beads. 40. Tubular bone bead. 41. Bar shell pendants. 42–43. Bear canine-shaped stone bead. 44. Clay pipe stem.

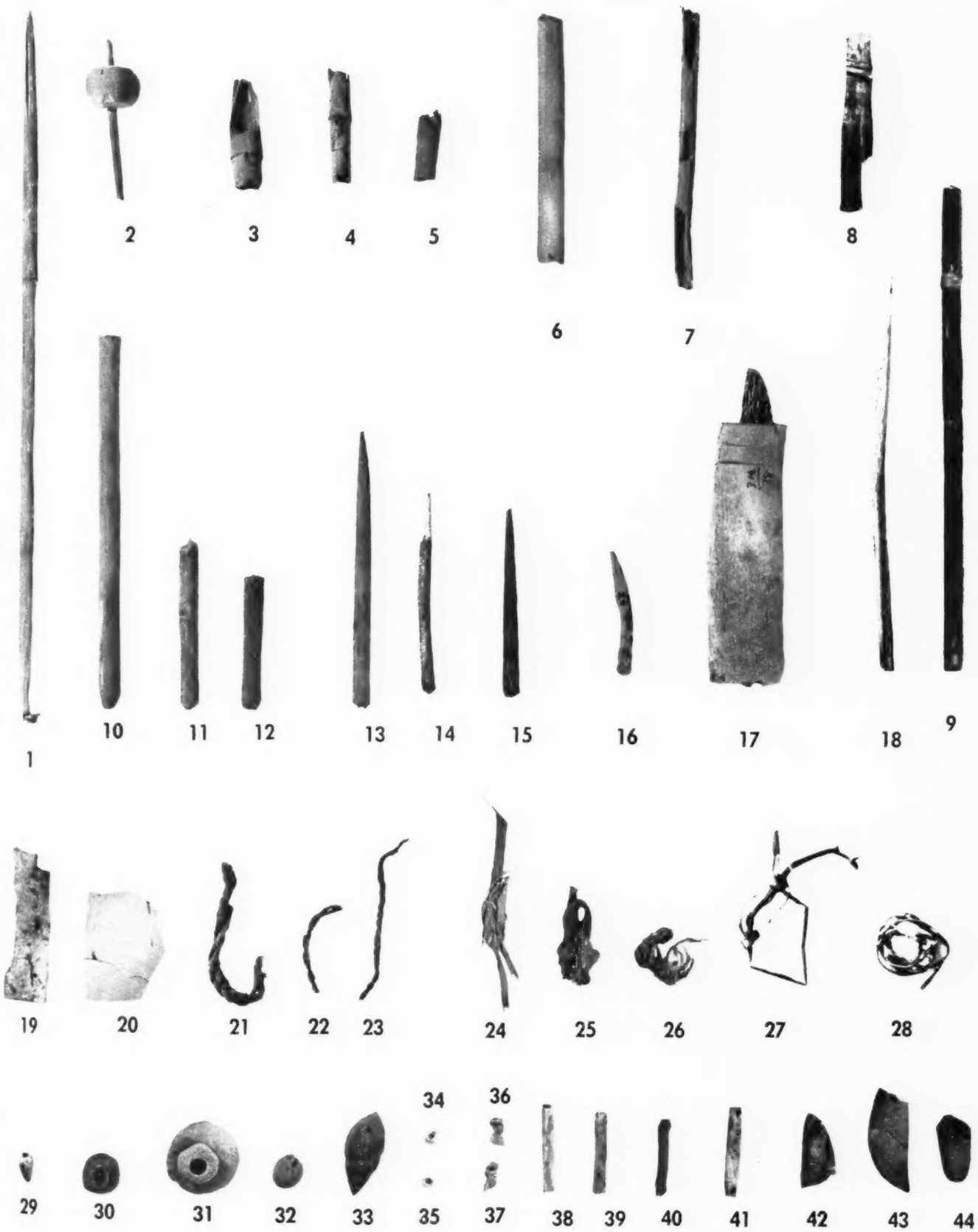
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FIG. 33.

Bar Shell Pendant

(Fig. 33, No. 41, p. 95)

This single pendant was found in a Los Angeles layer. It is made from a conch shell, is 32 mm. long, 5 mm. wide, and 3 mm. thick and is rectangular in cross-section and outline. Each of its ends is pierced by a hole half a millimeter in diameter. In the piercing, a hole has been drilled obliquely toward the end from one of the flat surfaces near that end. Then another hole has been drilled from that end to connect with the first hole.

A few similar beads occur in the Barril and Brownville complex of the Rio Grande delta region.

Worked Conch Shell

One triangular side of a conch shell with rounded ground edges occurred in Level 2 of Tm c 174, a La Perra component. It is 3 mm. thick, 77 mm. long, and 68 mm. wide. Whether it is a complete artifact and some sort of shell spoon, or an incomplete pendant, could not be determined.

Marginella Beads

(Fig. 33, No. 29, p. 95)

Twenty-six marginella beads were found in a Nogales level. All are about 10 mm. long, conical in shape, with a maximum diameter of 6 mm. The central core of all has been removed by the drilling of a hole about 3 mm. in diameter.

They also occur in the Brownsville and Barril Complexes of the Rio Grande delta region.

Snail Shell Beads

(Fig. 33, No. 33, p. 95)

Appearing in Almagre and La Perra layers were four snail (*Balimulus* sp.) shells, which have a hole about 2 mm. in diameter pierced in one side of each.

Bear Canine-shaped Stone Beads

(Fig. 33, No. 42, 43, p. 95)

Occurring in the Almagre levels of Tm c 314 were two beads ground from sandstone. They both are broken, but a reconstruction reveals they were in the shape of a bear canine tooth, about 45 mm. long, ovoid in cross-section, with a maximum thickness of 6 mm. and a maximum width of 14 mm. They are pointed at both ends with one edge convex and the other almost straight. In one end, a hole about 3 mm. in diameter has been drilled from their two wider surfaces.

Clay Beads

(Fig. 33, No. 32, p. 95)

Clay beads were picked up on the surface of Tm r 172, a Laguna component, and I was given one from Tm r 6, an Eslabones site. They are ellipsoidal in form, being about 10 mm. wide and 15 mm. long, and have a 2 mm. hole running through them lengthwise.

TABLE 8

DISTRIBUTION OF BONE, STONE, SHELL, CLAY AND COPPER ORNAMENTS IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components	Total	Conch Effigy Bead	Tubular Conch Bead	Shell Disk Bead	Marginella Bead	Snail Shell Bead	Worked Conch Shell	Bear Canine-shaped Stone Bead	Clay Bead	Spherical Stone Bead	Tubular Bone Bead	Bone Disk Bead	Copper Ear-spool	Bar Shell Pendent
Los Angeles	Tm c 82, layer 1	84		1	4							1	78		
	Tm c 314, layer 1	4										2		1	1
	Total Los Angeles ornaments	88		1	4							3	78	1	1
La Salta	Tm c 314, layer 2	2				1					?	1?			
Eslabones	Tm r 6, level 1	2								1	1				
Laguna	Tm r 88	1									1				
	Tm r 172	3								1	2				
	Total Laguna ornaments	4								1	3				
Almagre	Tm c 315, level 5	1					1								
	Tm c 314, layer 3	2							2						
	Total Almagre ornaments	3					1		2						
La Perra	Tm c 174, layer 2	1						1							
	Tm c 315, levels 8–9	3					3								
	Total La Perra ornaments	4					3	1							
Nogales	Tm c 314, layer 4	66	3	3	34	26									
	Grand Total of Ornaments	169	3	4	38	27	4	1	2	2	4	4	78	1	1

Spherical Stone Beads

(Fig. 33, No. 30, p. 95)

These four beads occurred in Tm r 172 and Tm r 88 (Laguna components) and Tm r 6, an Eslabones ruin. They range from 17 to 28 mm. in diameter, and all have holes 3 mm. in diameter drilled through them from two sides. They are all made from a hard, dark green stone, perhaps jade. Similar beads are common in Meso-America.

Tubular Bone Beads

(Fig. 33, No. 40, p. 95)

Three beads made from bird leg bones occurred in Los Angeles levels. One from Tm c 314, Level 1, is 14 mm. long and 9 mm. wide, while the other two from Tm c 82 and 314 are about 30 mm. long and 5 mm. in diameter.

Bone Disk Beads

(Fig. 33, No. 35, p. 95)

Similar to the shell disk beads were seventy-eight bone beads from the Los Angeles burial in Tm c 82. They all are thin slices (3 mm. thick) fom a hollow bird leg bone, about 7 mm. in diameter.

Copper Ear-spool

(Fig. 33, No. 31, p. 95)

This copper object was in a Los Angeles level at Tm c 314. Its central hole (4 mm. in diameter) was formed by casting, as was its slightly concave outer surface. Its outer disks are lens-shaped, 5 mm. thick, and 26 mm. in diameter, and the inner convex portion seems to have been beaten and abraded. Around the hole on one half is a small doughnut-shaped section about 14 mm. in diameter and 5 mm. thick, formed by beating and abrading.

A similar ear-plug was found by Ekholm in a Las Flores (V) level at Tampico.[122]

7. PERISHABLES

Our sample of perishables is inadequate as only 162 specimens (53 of which are yucca strands) were uncovered in one Los Angeles component (Layer 1 of Tm c 314), one Laguna component (Layer 1 of Tm c 174), and two La Perra components (Layers 2 and 3 of Tm c 174). The discussion has been divided into five parts: knots, string, weaving, projectile point parts, and other tools.

Six different kinds of knots of yucca were uncovered. Square knots were most common in all three horizons. These may be divided into two categories: square knots connecting two pieces of string, and square knots of two ends of a single piece of string to form a loop. Our sample is too inadequate to indicate any significant temporal trends, but it should be noted that all four of the Laguna square knots are for making loops. In the other two horizons, however, both forms of square knots appear in equal amounts.

Two granny knots appeared in a La Perra level, as did a loop made with a slip knot. This piece of yucca with a slip-knot might well have been part of a snare.

Overhand knots appear in all three horizons while wound rings of yucca are found in both the Laguna and La Perra levels.

All these knots were made with yucca strands, and in excavation single yucca or agave strands were common in all three horizons. However, actual strings were made. Most string was made from fibres of maguey that were S-twisted to form yarn. One single piece of this yarn was found in Laguna levels, while Z-twisted cords made of two S-twisted yarns were in all the levels bearing perishables. Three pieces of Z-twisted cord made of three S-twisted yarns occurred in the La Perra horizon while one occurred in a Laguna layer. This most primitive type of cord was probably made by rolling agave fibre down the right thigh with the palm of the right hand. In Laguna times there is a shift in type of yarn and the technique for making it. First of all, cotton fibre appears, and secondly (evidenced by both three individual pieces and many hundreds more in the two woven pieces of cloth) most of these fibres are Z-twisted to make a single yarn cord. The tightness of the twist and the small diameter of the yarn suggest this cord was made by rolling fibres on a spindle upward from the knee with the right hand (Underhill's Eastern Pueblo method).[123] Some cotton, however, from both the Laguna horizon (one piece) and the Los Angeles horizon (two pieces) was not spun on a spindle but made in the manner of agave cord, being a Z-twisted cord of the S-twisted yarns. This suggests that, while cotton continued to be grown in Los Angeles times, the use of a spindle had died out. This hypothesis is further confirmed by the fact that pierced clay disks which could have been spindle whorls occur in the Laguna horizon but are absent in Los Angeles levels.

The trends in cordage suggested by our meagre sample from the Sierra de Tamaulipas—S-twisted agave or maguey yarns being followed by Z-twisted cotton yarn about pottery times and S-twisted hard fibre yarn followed in late prehistoric times by S-twisted cotton and agave yarn—are generally in agreement with the sequence of string from southwest Tamaulipas where a much larger sample was uncovered.

Some of the above string types were woven into cloth and nets. Our present data suggest that during La Perra times full-turned coiled nets made from Z-twisted cords of two S-twisted agave yarns were used as blan-

[122] Ekholm, 1944: 379.

[123] Underhill, 1944.

kets or cloth and that by Laguna times these had been replaced (or supplemented) by fabrics made from Z-twisted spindle twisted cotton yarn that had been woven on a loom into two-and-two twill cloth in which the warp was used singly and the weft was double.

Sierra de Tamaulipas mats made from yucca or palm strands also show a distinct shift between pre-pottery and pottery horizons, even though our sample is small. One mat from La Perra is check-woven (1/1) while the other is twilled (2/2) but both have a single oblique corner and three square corners. The two mats from the Laguna component and the two from Los Angeles are twilled with four square corners. Basketry shows a a similar picture with a basket fragment of simple coiled rod foundation stitch and weave type in the La Perra horizons and a basket fragment of a small split stitch with a bundle foundation from the Los Angeles preserved level.

There also was found a woven ring, about 60 mm. in diameter, composed of three S-twisted strands in a Laguna level.

Thus in contrast to the knots, which show La Perra with the largest variety and biggest number, the string and weaving specimens display the use of a few simple techniques in La Perra times and great improvement in the Laguna horizon with slightly poorer mastery in Los Angeles times.

Turning to the fragments of weapons, though our sample is limited, there is evidence of significant changes. The La Perra horizon is represented by two distal fragments of the mainshafts of atlatl darts. Laguna has a fragment of the distal end of an atlatl mainshaft dart and a possible distal end of an arrow mainshaft. Los Angeles is represented by two arrow foreshafts and four pieces of cane of small diameter that may be arrow mainshafts. This evidence points to a major shift in weapons—from the use of the atlatl to a period of both the arrow and atlatl being used to a period when the bow and arrow is the only projectile weapon. These trends parallel similar ones found in numerous parts of North America.

Besides these perishable remains there were twenty-seven other preserved tools of diverse function. Eleven of these are sticks whittled to a point, three of which may have been arrow foreshafts in the making, but the actual use of the other eight is unknown. Similar to these are five short sticks in the Los Angeles horizon with cut rounded ends. Deer leather occurs in all horizons; the La Perra and Laguna specimens have the fur adhering, while the two Los Angeles specimens do not. Furthermore, the Los Angeles leather is pierced along its edges. There is a fragment of gourd in the Los Angeles horizon which is also pierced along its edge (perhaps a water-bottle or bowl fragment). All the other specimens come from the Los Angeles horizon and include five cane cigarette butts, a flute of cane, and a nut with a stick pushed through a hole in it. These tools, other than the pointed and rounded sticks, sug-

TABLE 9

Distribution of Perishable Artifacts in the Sierra de Tamaulipas

Phase	Excavated Components	Cordage								Knots					Weaving							Weapons		Other Artifacts							
		Yucca Strands	Z-twisted Cord of Three S-twisted Agave Yarns	Z-twisted Cord of Two S-twisted Agave Yarns	Cord of One S-twisted Yarn of Agave Fibers	S-twisted Cord of Two Z-twisted Cotton Yarns	Z-twisted Cotton Yarn (Cord)	Z-twisted Cord of Two S-twisted Cotton Yarns	Square Knot	Square Knot with a Loop	Granny Knot	Slip Loop Knot	Overhand Knot	Wound Coil	Full-turned Coiled Netting	Oblique Checker-weave Mat	One-rod Foundation Multiple Stitch and Wrap-coiled Basket	Oblique Twilled Mat with Squared Corners	Rectangular Oblique Twilled Mats	Woven Ring	2/2 Twilled Cotton Cloth	Split Stitch Bundle Foundation Basket	Atlatl Dart Mainshafts	Arrow Mainshafts	Arrow Foreshafts	Small Sticks Whittled to a Point	Cane Flute	Round-ended Stick	Cane Cigarette Butts	Nut on a Stick	Pierced Leather	Pierced Gourd	Deer Leather
Los Angeles	Tm c 314, layer 1	4	3		1			2	1	1			2									1		2	4	1	5	5	1	2	1	2
Laguna	Tm c 174, layer 1	33		1	1		3			4		1	1	9					2	1			2								
La Perra	Tm c 174, layer 2	12		2					2	2	2	1	1	7	1		1	1					2		3						
	Tm c 174, layer 3	4		1					1	1			1		1	1								12							
	Grand Total of Perishables—162	53	4	13	1	1	3	2	5	8	2	1	4	16	2	1	1	1	4	1	2	1	3	3	2	11	1	5	5	1	2	1	2

gest a number of innovations in the Los Angeles horizon. The pierced leather points to leather clothing or shoes; the pierced gourd suggests the use of gourd receptacles instead of only pottery ones; the cane flute suggests a shift from the use of clay ones; and canes with burned ends show the use of cigarettes.

KNOTS

Square Knots

(Fig. 33, No. 25, p. 95)

Thirteen strands of yucca from 3 to 8 mm. wide were tied in square knots. Most of the knots were relatively tight, being between 5 and 10 mm. in length. Eight of the specimens are two ends of the same string tied together to form a loop. Loops vary between 50 and 300 mm. in diameter, and one of the loops from the Laguna horizon has been wound into a ring. It has been suggested that these were used in carrying;[124] similar ones have been found in the Southwest.[125]

Beside these loops with square knots there are five examples where two unconnected pieces of string have been tied together by square knots.

As far as Tamaulipas is concerned, square knots occur in the La Perra, Laguna, and Los Angeles horizons, and are the most common kind of knot.

Square knots are the most common type of knot at such cave sites as Tularosa and Cordova Caves,[126] Canyon Creek Ruin,[127] Medicine Cave,[128] and Ventana Cave,[129] of the Southwest, and Fate Bell shelter in the Big Bend area.[130] Promontory Cave[131] contrasts with La Perra in having mainly overhand knots, while Lovelock,[132] with a predominance of sheepbends, is also different. Illustrations of the Oregon caves' knots[133] (there were no statistics on knots given) also do not show square knots.

Granny Knots

(Fig. 33, No. 24, p. 95)

Two fibres of different width (5 mm. and 3 mm.) are tied together by a granny knot. The knot is loose, and the twine is about 15 mm. long. Most of the caves in the Southwest have a few of these. The ones in Tamaulipas came from a La Perra level.

Overhand Knots

(Fig. 33, No. 26, p. 95)

Overhand knots are of yucca, and all are on short strands about 4 mm. wide. The knots are relatively loose—12 mm. long—and one wonders if they were originally part of slip loops. Overhand knots are common over a wide area and appeared in La Perra, Laguna, and Los Angeles times.

Slip-Loop

(Fig. 33, No. 27, p. 95)

The one slip-loop of yucca came from a La Perra level. The strand is about 5 mm. wide and the knot about 10 mm. long. It may have been used as a snare or as a carrying device. Similar knots are found in the Southwest.

Wound Coil

(Fig. 33, No. 28, p. 95)

These rings are of yucca or palm leaf 2 to 8 mm. wide and wound into rings 20 to 50 mm. in diameter. They occurred in the La Perra and Laguna horizons. Their function is unknown. They are also present in the Southwest.[134]

CORDAGE

1. *A cord of single strand S-twisted yarn of agave fibres* was recovered from the Laguna level of La Perra Cave. It is composed of about twenty-five fibres and is 2 mm. in diameter. This is a rare type in both Tamaulipas and the Southwest.

2. *Thirteen individual specimens and a net of Z-twisted cord composed of two S-twisted yarns of agave* (fig. 33, no. 22, p. 100) occurred in the La Perra, Laguna, and Los Angeles Phases. The yarns are composed of from eleven to fifty-eight individual maguey fibres, and the average piece of yarn is about 0.5 mm. in diameter. It is a dominant form in all the three preserved Sierra de Tamaulipas horizons. Ventana Cave in southwest Arizona,[135] Basketmaker and Pueblo sites of Arizona and New Mexico,[136] Tularosa and Cordova caves in Arizona,[137] Upper Gila caves,[138] the Big Bend area of Texas,[139] Lovelock Cave,[140] Oregon caves,[141] and Coahuila caves,[142] like Tamaulipas, have predominantly two-strand Z-twisted cordage. It is of

[124] Martin *et al.*, 1952: 214 and 223.
[125] Underhill, 1944.
[126] Martin *et al.*, 1952: 212.
[127] Haury, 1934: 87.
[128] Bartlett, 1934: 45.
[129] Haury, 1950: 397, 398.
[130] Pearce and Jackson, 1933: 92.
[131] Steward, 1937: 36, 37.
[132] Loud and Harrington, 1929: 84–87.
[133] Cressman, 1942: 77, 78, fig. 37.
[134] Martin *at al.*, 1952: 221.
[135] Haury, 1950: 391–394.
[136] Kidder and Guernsey, 1919: 113.
[137] Martin, Rinaldo, Bluhm, Cutler, and Grange, 1952: 205-211.
[138] Cosgrove, 1947: 67, 68.
[139] Quinn and Holden, 1948: 118.
[140] Loud and Harrington, 1929: 22–83.
[141] Cressman, 1942: 77.
[142] Taylor, 1948: 162.

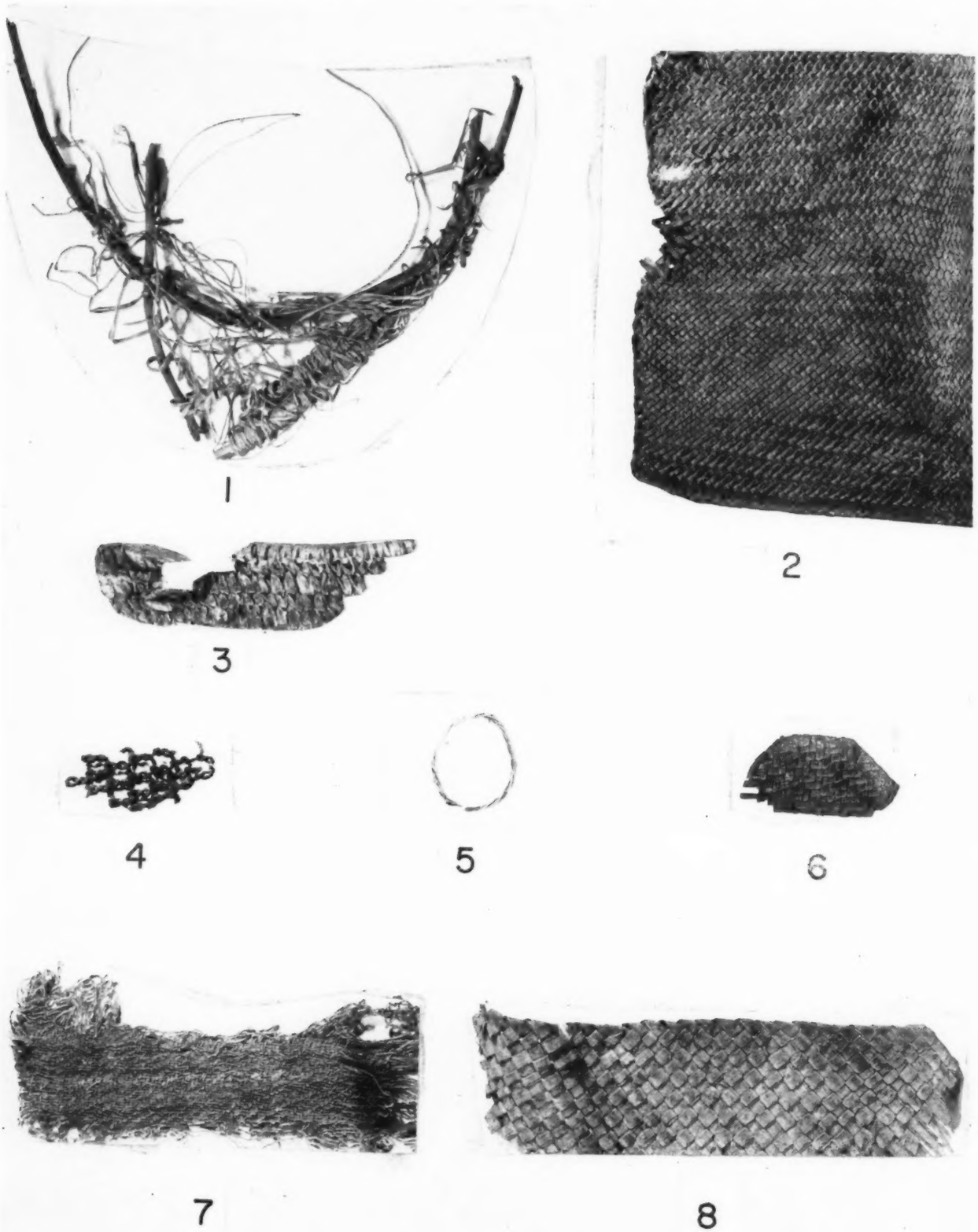

FIG. 34. Woven materials (1/2 natural size). 1. Stitch and wrap coiled basket fragment. 2. Rectangular oblique twilled mat. 3. Split-stitch bundle foundation basket fragment. 4. Full-turned coiled netting. 5. Woven ring. 6. Obliqued twilled mat with squared corners. 7. Twilled cotton cloth. 8. Oblique checker-weave mat.

some interest to note that Gypsum Cave[143] and Promontory Cave [144] do not have this type in predominance.

3. *Three Z-twisted cords composed of three S-twisted yarns of agave fibre* (fig. 33, no. 21, p. 95) occurred in the La Perra horizon, and a single small piece was found with the Laguna Phase. All yarns are made of about a dozen tightly-twisted fibres, and the tightly-twisted cords are about 1 mm. in diameter.

This seems to be an early type in the Sierra de Tamaulipas, but in the Southwest in the Mogollon area it occurs in all horizons [145] and also in the Anasazi [146] and Hohokam area [147] as a minority type.

4. *Two cords of Z-twisted cord of two S-twisted yarns of cotton* (fig. 33, no. 23, p. 95) occurred in the preserved Los Angeles layer. Although the yarns are tightly woven, they vary in diameter, so I suspect they were not twisted by means of a spindle but by hand. The cords are about 2 mm. in diameter.

In the Southwest the cotton cordage of the late Mogollon level is similar.[148]

5. Three cords and the cords of two fabrics of the Laguna Phase are *Z-twisted cotton fibres* (fig. 34, no. 7, p. 100). Their uniform diameter, about three-quarters of a millimeter, and their tight twist suggest that they were made with a spindle. As Bluhm has pointed out, this is the dominant form of cotton or bast yarn in the Southwest.[149]

6. *One piece of S-twisted yarn composed of two Z-twisted cotton yarns* was found in a Laguna level. The yarn and cord appear to have been made by use of a spindle. The cords are about 1.5 mm. in diameter. This form of cord occurs in the early Mogollon levels [150] and is considered by Underhill to be typical of the eastern Pueblos and of the prehistoric peoples of the Southwest.[151]

WEAVING

Full-turned Coiled Netting

(Fig. 34, No. 4, p. 100; Fig. 35, p. 101)

Two pieces of net were found at Tm c 174 in La Perra levels. One was a small piece about 2 inches in diameter from Level 3. The other was a large fragment of woven net blanket in which was wrapped the mummified burial of Layer 2. Though the blanket was never unwrapped or stretched out, I estimate it to have been about 2 feet wide and 3 feet long. The yarn of both nets is made from maguey fibre and between ten to twenty of them have been twisted clockwise. Two

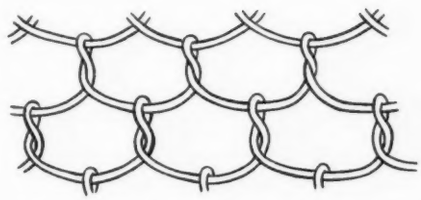

FIG. 35. Full-turned coiled netting, about twice natural size (from Sq. N20W5, Layer 3, Tm c 174).

elements of yarn have later been twisted counter-clockwise to form cord 3 mm. in diameter.

The net has been formed by taking a length of cord about 3 feet long and making small folds in it about 10 mm. high and 6 mm. apart. Next, these folds were given a full clockwise turn, thereby forming a small loop. Then the second line was started. The end of the rope was pushed all the way through one loop at the extremity of the first line, brought to a fold next to it, given a full clockwise turn to form a loop, and the end passed through the next loop. The process was repeated until the blanket was completed. The end product is a rectangular net with a 7 mm. mesh, or four loops per inch or per 25 mm., and three rows per inch or per 25 mm.

Archaeologically, nets such as these have been found in caves in southwest Tamaulipas,[152] Coahuila,[153] in the Big Bend area of Texas, and the Upper Gila and Hueco areas of Texas.[154] This type of net, however, seems to be absent from many Mogollon caves,[155] Ventana Cave,[156] Basket-maker caves of northeastern Arizona,[157] and the caves in the Great Basin.[158] Thus this type seems to have a significant southern distribution.

On the basis of the finding of a net over a mummy, I suspect that nets with a small mesh were used as clothing or blankets by the La Perra people.

Twilled Cotton Cloth

(Fig. 34, No. 7, p. 100)

Two pieces of woven cotton cloth occurred in Layer 1 of Tm c 174 and are considered to belong to the Laguna Phase. One is a piece roughly 150 mm. long and 40 mm. wide; the other is about 200 mm. long and 80 mm. wide. Both are of the same weave. The larger one, fortunately, has a small fragment of the selvage still apparent.

The yarn is made of Z-twisted cotton fibre 2 mm. in diameter. The weft of this cloth is double, and the warp

[143] Harrington, 1933: 158–161.
[144] Steward, 1937: 37–40.
[145] Martin *et al.*, 1952.
[146] Kidder and Guernsey, 1919.
[147] Haury, 1950.
[148] Martin *et al.*, 1952.
[149] *Ibid.*, 208.
[150] *Ibid.*
[151] Underhill, 1944.
[152] Romero and Valenzuela, 1945.
[153] According to Mrs. Johnson they appear in Coyote Cave excavated by Palmer, and Candelaria excavated by Aveleyra in Coahuila.
[154] Cosgrove, 1947.
[155] Martin *et al.*, 1952.
[156] Haury, 1950.
[157] Kidder and Guernsey, 1919.
[158] Cressman, 1942.

is single. It is twilled, in that the weft passes over two warps and under two warps, starting one thread over on each line. There are eighteen to twenty-five pairs of threads to each 25 mm. square. The small fragment of selvage shows that one corner was finger-knotted.

The cloth was woven on a loom, and I suspect that this loom was some form larger than a belt loom.

This kind of cloth is known from the Palmillas culture of southwest Tamaulipas, from the cenote at Chichén Itzá in Yucatan, and according to Mrs. Johnson, is common ethnologically in Mexico. It seems to be absent, archaeologically, from the Southwest where plain, one-over-one is common.[159]

Oblique Checker-weave Mat

(Fig. 34, No. 8, p. 100)

One fragment of a simple checker-weave mat occurred in Layer 3 under the burial in La Perra Cave. It is made of yucca strands about 4 to 5 mm. wide. It is a simple over-one under-one weave with the strands at an oblique angle to the sides of the mat. At the edge of the mat the strands are folded over to form a right angle.

The original mat was 20 mm. wide (or long) and seems to have been square or rectangular with oblated corners.

Mats of this general type are absent in the Southwest and the Great Basin area. Cosgrove, however, has noted that they do occur in Hueco area, in the Big Bend, and in Coahuila.[160] In southwest Tamaulipas, similar mats occur frequently in pre-pottery levels and last into pottery times as a minority mat type.

Since the two later types from Layer 1 were found in beds of leaves, I suspect that this mat, like those, was used as some sort of a pillow or served as a mattress.

Oblique Twilled Mat with Squared Corners

(Fig. 34, No. 6, p. 100)

This small fragment of the oblated corner, found above the burial at the junction of Layers 1 and 2 of Tm c 174, I have assigned to the La Perra horizon, but its position right at the bottom of the rolled and scuffed leaves of the Laguna occupation makes this conclusion a very tentative one. The elements of this mat are yucca and palm fibres about 2.5 mm. wide, which form a twilled over-two under-two pattern. The fibres are folded over at a 90-degree angle at the borders.

This type of matting appears in northeastern Arizona,[161] in the Mogollon area,[162] and in the Big Bend area.[163] The borders of the Anasazi mats are slightly different, but otherwise the mats are the same as La Perra's. None of these other mats seem to be quite the same shape as the La Perra ones.

Like the mat previously described, they were probably part of La Perra bedding.

Rectangular Oblique Twilled Mats

(Fig. 34, No. 2, p. 100)

Two complete rectangular twilled mats occurred in Layer 1 of Tm c 174 in the Laguna Phase, and two parts of mats occurred in Level 1, Tm c 314, a Los Angeles layer. All were in "beds" of leaves. The fibre of these mats is yucca over-two under-two with the strands folded over at a 90-degree angle at the borders. The Laguna mats are 175 mm. wide and 225 mm. long and 280 mm. by 350 mm.; the Los Angeles specimens are small fragments.

This type of mat occurs in northeastern Arizona,[164] the Mogollon,[165] the Big Bend,[166] and one was found in caves near Ocampo, Tamaulipas.[167]

Woven Ring

(Fig. 34, No. 5, p. 100)

One small ring 63 mm. in diameter occurred in the Laguna layer (1) of Tm c 174. It is composed of two strands of vine about 1 mm. in diameter, which have been wound together in a clockwise twist to form a ring.

I know of no similar objects from other archaeological assemblages.

One-rod Foundation Multiple Stitch and Wrap-coiled Basket

(Fig. 34, No. 1, p. 100 and Fig. 35, p. 103)

In the upper part of Layer 2 of Tm c 174 a fragment of coiled basket occurred. It has a one-rod foundation of unshaved twigs and about 2 mm. in diameter. The sewing elements are of yucca, .5 mm. to 2 mm. wide. This small fragment of basket is about 150 mm. long and is only about 25 mm. wide as only three of the rods remain. It is a coiled basket type that Cosgrove has called one-rod foundation with multiple stitch and wrap. The yucca strands are wrapped around the rod from two to six times and then passed to the next rod, and wrapped around it, etc. Judging from the curvature of the rods of the fragment, the whole basket was from 200 to 300 mm. in diameter.

This type is relatively rare in most other areas, but Cosgrove notes that besides appearing in Water Canyon Cave in the Upper Gila, this type appears occasionally in the Basket Maker sites in the Anasazi area and possibly in some of the Big Bend sites.[168]

[159] Martin *et al.*, 1952: 244.
[160] Cosgrove, 1947.
[161] Kidder and Guernsey, 1919.
[162] Martin *et al.*, 1952.
[163] Pearce and Jackson, 1933.
[164] Kidder and Guernsey, 1919.
[165] Martin *et al.*, 1952.
[166] Pearce and Jackson, 1933.
[167] Romero and Valenzuela, 1945.
[168] Cosgrove, 1947: 100, fig. 33 C, and p. 99.

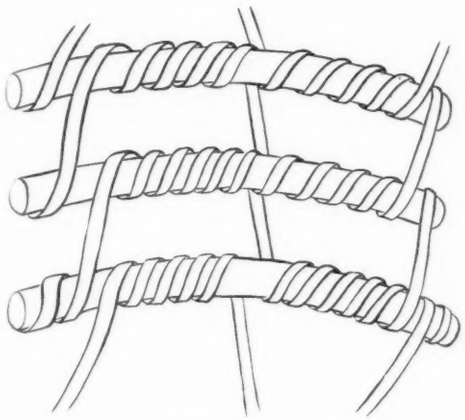

FIG. 36. One rod multiple stitch and wrap-coiled basketry, about natural size (from Sq. N10W5, Layer 2, Tm c 174).

Split Stitch Bundle Foundation

(Fig. 34, No. 3, p. 100)

This very small fragment (10 by 15 mm.) from the initial test trench of Tm c 314 came from a Los Angeles level. The fragment has a bundle foundation of grass stalks about 8 mm. in diameter (three or four coils per 25 mm.). The sewing element is yucca about 3 mm. wide, and the two, side by side, occupy about 10 mm. (five stitches to 25 mm.). The yucca stitches come out of the lower bundle unsplit and pass up to the right over the next bundle. As they approach the top bundle they become split, and other unsplit elements come through them. Then as the original element passes over the top bundle, the split ceases, and it goes down to the right on the inside of the basket and again enters the centre of the lower bundle.

Split stitch bundle foundation coiled baskets are absent in the Great Basin,[169] occur as a minority type in the Southwest (being slightly more prevalent in Hohokam [170] than in the Anasazi [171] or Mogollon regions [172]), but are a majority type in the Big Bend,[173] Coahuila,[174] and southwest Tamaulipas. Thus this type seems to have a mainly southern distribution. If the Carbon-14 dates are correct, it may have originated in that general region about 8,000 years ago.

WOODEN WEAPONS

Atlatl Dart Mainshaft Fragments

(Fig. 33, No. 8, p. 95)

Two fragments of what I believe are composite dart mainshafts occurred in the La Perra, Layer 2 of Tm c 174. A smaller fragment occurred in the lower part of the Laguna layer; it might actually be a La Perra artifact fragment. Two are small fragments 65 mm. long; the other is 120 mm. long. All are made from cane about 13 or 14 mm. in diameter.

The fragments have one end that is broken off, but the other end is neatly cut; the inside of the cane shows wear and the outside is wrapped with yucca fibre for a distance of an inch back from the cut end.

On the basis of the relatively large diameter of the cane of the shafts I have identified these objects as being atlatl dart mainshaft fragments. The fragments would be distal ends with yucca fibre wrapped around the hollow end to keep the foreshaft from splitting it.

At the present time the atlatl complex of La Perra is too limited to make any sort of significant comparisons. However, atlatl mainshafts with reinforced holes for a foreshaft are a common feature of early culture remains from such caves as those of northeastern Arizona,[175] the Mogollon area,[176] the Guadalupe area,[177] the Big Bend area,[178] the Great Basin,[179] the Ozarks,[180] and southwest Tamaulipas. These specimens range in time from 7,038 (±250) years ago in Leonard Rockshelter [181] to 1,000 years ago in the Pecos River Focus (and historic times in central Mexico). Minor differences in atlatl mainshafts lie in the fact that some are of wood and others cane; some are painted and incised, and others undecorated; and in the presence or absences of various kinds of reinforcing. However, until more La Perra and Laguna specimens are available, it is difficult to say whether these plain specimens can be of any significance in correlating La Perra with other cultures.

Arrow Mainshaft Fragments

(Fig. 33, No. 9, p. 95)

One fragment, 145 mm. long and 8 mm. in diameter, from a Laguna level, and two fragments, one of which is 125 mm. long and 7 mm. in diameter and the other 40 mm. long and 11 mm. in diameter, from Los Angeles levels are considered to be arrow mainshafts. Each has one end neatly cut and the hollow inside worn, while the other end is broken. The Laguna one has fine yucca fibres wrapped around it about 25 mm. from its cut end, perhaps to prevent the foreshaft from splitting the mainshaft.

Compound arrows are known over a wide area of North America. In Tamaulipas they are late, and in the Arctic they are perhaps 4,000 to 6,000 years old. It would seem they have spread southward very slowly.

[169] Loud and Harrington, 1924: 63; and Steward, 1937: 33–34.
[170] Haury, 1950: 403–407.
[171] Morris and Bough, 1931: 10; and Haury, 1934: 74.
[172] Martin *et al.*, 1952: 250–251.
[173] Setzler, 1932: 138. Pearce and Jackson, 1933: 106–114.
[174] Cosgrove, 1947: 108.
[175] Kidder and Guernsey, 1919: 181–182.
[176] Cosgrove, 1947: 50–58. Harrington, 1928: 10. Martin *et al.*, 1952: 331–382.
[177] Howard, 1930, 1935: 70. Ferdon, 1946: 19.
[178] Pearce and Jackson, 1933: 121–122.
[179] Loud and Harrington, 1929: 98. Cressman, 1942: 70.
[180] Harrington, 1924: 5.
[181] Heizer, 1951.

Arrow Foreshafts

(Fig. 33, No. 1, 15, p. 95)

At Tm c 314 in the Los Angeles level, two arrow foreshafts were recovered. Both are about 250 mm. long, have a maximum diameter of 7 or 8 mm., and are double pointed. The points at either end are slightly different, distal end being crudely whittled to a point (in both specimens it is blunted owing to wear), while the proximal ends are neatly sanded and polished and are perfectly conical. Some of this smoothing or polishing of the proximal end may have been due to wear inside the mainshaft.

Similar arrow foreshafts occur over a wide area.

OTHER PERISHABLE ARTIFACTS

Small Sticks Whittled to a Point

(Fig. 33, No. 13–14, p. 95)

Eleven small sticks from the La Perra, Laguna, and Los Angeles Phases, 46 mm. to 100 mm. in length, and about 6 mm. in diameter, have whittled points. The whittled point is from 10 to 28 mm. in length.

Pointed sticks like these have been found in Pecos River Focus sites,[182] in Ventana Cave [183] and in various caves in the Northern Great Basin area [184] and the Southwest.[185] There are a number of possible uses for such objects, but on the basis of our present evidence one cannot say exactly what these particular pointed sticks were used for.

Rounded Sticks

(Fig. 33, No. 10–12, p. 95)

Very similar to the pointed sticks are five sticks whittled to a round end in the Los Angeles layer of Tm c 314. They range in length from 46 to 134 mm. and are from 7 to 10 mm. in diameter. All have had their sides scraped clean. One end is cut off straight by slicing it and then snapping it; the other is whittled to a round end. They appear to have been unused as there is no wear-polish or pounding on them.

The distribution of similar objects and their function are unkown to me.

Cane Flute

(Fig. 33, No. 7, p. 95)

One cane flute, broken at both ends, occurred in a Los Angeles level. It is 104 mm. in length, 8 mm. in diameter, and has three rectangular cut holes 10 mm. long and 2 mm. wide. One of the broken ends has some gum on it.

Reed flutes are known from the Anasazi,[186] the Mogollon,[187] and the Hohokam [188] of the Southwest, as well as from the Great Basin,[189] the Big Bend area,[190] and southwest Tamaulipas. In Tamaulipas they seem later than in the Southwest.

Cane Cigarette Butts

(Fig. 33, No. 3–5, p. 95)

Five cane cigarette butts appeared in a Los Angeles level. All are made from cane 7 to 10 mm. in diameter and have one burned end. Three of them are cut, while two are broken just below the septum.

Granger records them as occurring throughout the Southwest, in the Trans-Pecos area and in Chihuahua.[191] They seem to be earlier in the Southwest (particularly the Mogollon area) than in Tamaulipas.

Nut on a Stick

(Fig. 33, No. 2, p. 95)

This object was found in a Los Angeles layer. It is a nut (*Dioon edule* seed) 18 mm. in diameter, which has its top and bottom cut flat, and a small whittled stick (62 mm. long and 3 mm. in diameter) thrust through a hole drilled from top to bottom through its core.

I know of no similar objects, nor do I know its function. It has been suggested that it is a spindle, a top, or a plug for a gourd bottle.

Pierced Gourd

(Fig. 33, No. 20, p. 95)

One fragment of gourd from a Los Angeles Layer had its stem cut off and at least two holes (2 mm. in diameter) just below. I suspect that string was drawn through these holes either to repair the side of a gourd container or to serve as handles on a gourd dish.

Similar worked gourds appear in the Mogollon area,[192] the Anasazi area,[193] and Ventana Cave.[194]

Leather

(Fig. 33, No. 19, p. 95)

Piece of deer leather with the fur attached was found in a Laguna level and another in a La Perra level, while two pieces of deer leather without the fur occurred in Los Angeles levels. The Los Angeles leather warrants further discussion as holes (2 mm. in

[182] Campbell, Kelley, and Lehmer, 1940.
[183] Haury, 1950: 416.
[184] Cressman, 1942: 93 *c* and *d*.
[185] Guernsey and Kidder, 1921: 92.
[186] Kidder and Guernsey, 1919: 186.
[187] Martin *et al.*, 1952: 357.
[188] Haury, 1950: 425.
[189] Harrington, 1933: 149; Steward, 1937: 42.
[190] Pearce and Jackson, 1933: 132–135.
[191] Martin *et al.*, 1952: 253.
[192] Cosgrove, 1947: 149.
[193] Kidder and Guernsey, 1919.
[194] Haury, 1950: 425.

diameter) about 20 mm. apart are drilled 4 mm. from the edge of each piece. One piece also has one straight edge next to a curved edge and at right angles to it. On the basis of the holes and the curved edge, I believe these Los Angeles specimens are pieces of huaraches. These also occur in San Antonio in southwest Tamaulipas.[195]

8. POTTERY

About 15,000 sherds were collected from fifty-two components in the Sierra de Tamaulipas. They were classified into eleven resident types and twelve kinds of aberrant sherds. They are the basis for differentiating the Laguna, Eslabones, La Salta, and Los Angeles Phases.

A type has been previously defined, and the method of establishing types explained. However, it seems worth while briefly reviewing just how the ceramic analysis proceeded. In the analysis the sherds from the stratified levels of Tm r 86 were studied first. From this study twelve trial types were established and various trends within the types noted. Then the sherds from Tm r 79 were classified, the trial types refined, and the trends noted. The results of these two studies were then compared. The upper levels of Tm r 86 were very similar to the lower levels of Tm r 79, indicating that the lower levels of Tm r 86 were earliest. The lower levels of Tm r 79 and upper levels of Tm r 86 were next in time, and finally the upper levels of Tm r 79. The changes in types and ceramic features determined in this analysis became the basis for establishing the Laguna, Eslabones, and La Salta Phases.

Next, the sherds from the stratified cave deposits (Tm c 81, Tm c 82, and Tm c 314) were compared with the types from Tm r 79 and Tm r 86. The earlier sherds from the caves were like those from Tm r 79 and 86, while the ones from the upper levels of the caves were radically different. These distinctive upper level sherds became the basis for establishing the Los Angeles Phase.

Then an analysis was made of the strata tests from Tm r 172, Tm r 88, Tm r 6, Tm r 78, and Tm c 83. No significant ceramic innovations were noted in these trenches, though several tests had percentages of types and ceramic features corresponding to the various components of the four phases. Tm r 172 and Tm r 88, since they were ceramically similar to Levels 5, 6, and 7 of Tm r 86, were considered to be components of the Laguna Phase. Tm r 6 sherds were closely related to those of Tm r 79, Levels 3 and 4, and Tm r 86, Levels 1 to 3, Eslabones components, while Tm r 78 was like the La Salta components, Tm r 79, Levels 1 and 2. Since Tm c 83 had a ceramic complex like the top layers of the caves Tm c 81, 82, and 314, it was classified as a Los Angeles component. Finally, sherds from surface collections were classified and compared with sherds from the excavated pits belonging to the various phases. Many of these surface collections were represented by meagre ceramic samples, but still they could be tentatively assigned to one of the phases. Tm r 194, 195, 196, 223, 302, 324, 301, 310, 262, 187, 338, 328, 185, 186, and 188 were found to be Laguna Phase sites. Tm r 304, and 311a were Eslabones components, while Tm r 90, Tm r 323, Tm c 322, and Tm c 289 were classified as La Salta sites. A large number of small sites found in survey belong to the Los Angeles Phase and include Tm c 312, 220, 84, 197, 198, 221, 222, 288, 290, 292, 294, 311, 316, 320, 325, 326, 327, and 293.

On the basis of trends in pottery types and ceramic features discerned in the stratified levels of the various excavated caves and of Tm r 86 and 79, all these other components could be aligned in their chronological order by seriation.

From the study of the sherds from the sites of the various phases (or even from just the stratified sites, Tm r 86, Tm r 79, Tm c 81, Tm c 82, and Tm c 314), significant trends in pottery types and pottery features were established as well as the ceramic characteristics diagnostic of each phase. Laguna Cream, Laguna Brown, and Laguna Orange types are confined to the Laguna Phase. Eslabones Red is mainly a Laguna Phase type, but it did appear during Eslabones times and was virtually absent in the La Salta Phase. La Salta Black, a minority type in early Laguna times, gradually increases throughout the period, reaches its maximum in the Eslabones Phase, and drops off in the La Salta Phase. Pueblito Brushed appears in about the same proportion in each of the three periods, and a few sherds of the type even occurred in Los Angeles components. Pueblito Plain, while being a major ware in both Laguna and Eslabones times, reaches its zenith in La Salta Phase, and a very few sherds of this type occur in Los Angeles sites. La Salta Polished, a minority type in Laguna times, reaches its maximum popularity in the Eslabones and La Salta Phases. All these types previously mentioned are almost completely replaced by Los Angeles Plain and Los Angeles Brushed during the Los Angeles Phase. Los Angeles Black appears as a minority type during the late part of that same phase (*see* table 10).

Perhaps more clearly differentiating the phases and the pottery types are the changes in vessel forms (fig. 37), decoration, and appendages. These are changes within the pottery types. In Laguna times, vessel feet are predominantly large, solid and conical; in Eslabones times, hollow and conical, small, solid and conical, and large, solid and conical, and in the La Salta Phase, mainly hollow and conical. In the Los Angeles Phase there are no vessel feet. In the Laguna Phase, decoration is mainly by incising on the inside of bowls or molcajetes. In the Eslabones Phase, interior incising is just slightly more prevalent than exterior rim engraving, while in La Salta times exterior rim engraving

[195] MacNeish, n.d.

is the most popular. Los Angeles vessels are without decoration.

A study of rim sherds and eleven more or less complete vessels reveals over fifty types of rim cross-sections (fig. 37). Various similar rim cross-sections may be combined into vessel forms. There are sixteen vessel forms. These have temporal significant distributions in the four archaeological phases. Short-necked thickened rim ollas, bowls with a basal ridge and bowls with vertical incurved-sides occur mainly in the Laguna Phase and disappear by La Salta times. Ollas with flaring rims at an acute angle to the body diminish from Laguna to La Salta times. Incurved rim bowls or seed-bowls also diminish from Laguna to La Salta times and then increase in the Los Angeles Phase. This reversal of a trend is, however, more apparent than real. Earlier seed-bowls are usually molcajetes with tripod feet, while later ones are plain incurved rim bowls. Thus, in reality, incurved rim-bowl molcajetes die out in the La Salta Phase and are replaced during Los Angeles times by incurved rim bowls. Plates and outsloping staight-sided carinated bowls, though appearing in both La Salta and Laguna Phases, are dominant in the Eslabones Phase. Hemispherical bowls and flaring-necked ollas show a gradual increase from Laguna to Los Angeles times. The earlier hemispherical bowls are molcajetes with feet; the Los Angeles ones are merely hemispherical vessels. Dominant vessel forms in all the three earlier phases, though slightly more prevalent in La Salta times, are out-flaring-sided carinated bowls. A few sherds of this form even appear in some Los Angeles levels. Carinated bowls with short vertical rims occur only in the La Salta Phase. Small-mouthed ollas with short vertical necks reach their maximum frequency in La Salta times but last into the Los Angeles Phase. They seem related to small-mouthed ollas with long vertical necks and large-mouthed ollas with incipient necks that are popular only in the Los Angeles Phase.

These trends in ceramic features in the Laguna, Eslabones, and La Salta Phases correspond to ones in the Huasteca from El Prisco (II) to Zaquil (IV) times. The El Prisco period, like Laguna, has a predominance of large, solid, conical vessel feet,[196] recurved-sided bowls,[197] basal ridge bowls,[198] ollas with thickened lips,[199] and incised decorations on the inside of bowls. Pithaya (III) is like the Eslabones Phase in having some hollow and solid conical feet,[200] angled-necked and flaring-necked ollas,[201] and a rise in the number of incurved rim bowls and outsloping straight-sided carinated bowls.[202] La Salta, like the Zaquil Period, sees engraving as the dominant form of decoration,[203] the dominance of hollow vessel feet, the dominance of flaring-necked ollas,[204] and a large number of out-flaring carinated bowls.[205]

Thus these general trends indicate correlations between the ceramic phases of the Huasteca and of the Sierra de Tamaulipas, but the trade sherds or aberrant sherds in the Sierra de Tamaulipas unequivocally link the two areas. The presence of four El Prisco Black sherds[206] in the trenches of Tm r 172 shows that El Prisco and Laguna are at least in part contemporaneous. Layer 2 of Tm c 314 contains one Zaquil Red and three Zaquil Black Incised sherds,[207] showing La Salta Phase and Zaquil (IV) to be of the same time period. The Los Angeles components have many more trade sherds. Huasteca Black-on-White, Tancol Brown-on-Buff, Tancol Polychrome, Zaquil Red, Panuco Grey, Tancol Black-on-Red, Las Flores molcajetes, and Panuco Heavy Plain sherds attest to the contemporaneity of Los Angeles and the Panuco (VI) Period.[208]

Glaze sherds and wheel-made sherds in some late Los Angeles components establish that these sites were historic. Perhaps the most amazing sherd associated with the Los Angeles remains in Tm c 314 was one classified as Leland Incised, which is a resident type in the Mississippi Period in the central Mississippi Valley of the eastern United States.[209] Eleven corrugated sherds from early Los Angeles components are equally strange. Although their paste is much like resident types and they bear a superficial resemblance to San Lorenzo Corrugated of southwest Tamaulipas, they are actually more like Leesburg Neck-banded of the Titus Focus of East Texas[210] and Cordova Micaceous-ribbed from early Pueblo (IV) from Pecos, New Mexico.[211] Unfortunately, I could not get these sherds more exactly identified.

Besides time and space relationships, Tamaulipas sherds tell us something of the everyday life of the prehistoric inhabitants. Pots of the Laguna, Eslabones, and La Salta Phases had a variety of functions. Molcajetes were undoubtedly used for *chili* grinding. The large olla forms were probably used primarily for carrying water and storage and secondarily for cooking, for only a few Pueblito Brushed sherds had carbon adhering to their inner surfaces. Various bowls and plates may have been used for storage, for food, and for decorative purposes. The proportion of decorated vessels to undecorated shows a gradual decrease (50 per cent to 46 per cent to 34 per cent) from Laguna to Eslabones

[196] Ekholm, 1944: 345.
[197] *Ibid.*, 345 fig. 4, *c-f*.
[198] *Ibid.*, 345, fig. 4, *a, b*.
[199] *Ibid.*, 346, fig. 4, *v-c*.
[200] *Ibid.*, 349.
[201] *Ibid.*, 351.
[202] *Ibid.*, 349–350.
[203] *Ibid.*, 352.
[204] *Ibid.*, 357.
[205] *Ibid.*, 352, fig. 8, *c-d*.
[206] *Ibid.*, 345.
[207] *Ibid.*, 352–355.
[208] *Ibid.*, 364, 365, 405–415.
[209] *See* p. 121.
[210] Krieger, 1946: pl. 34–35.
[211] Mera, 1935: pl. 10.

TABLE 10

DISTRIBUTION OF POTTERY (SHERD) TYPES IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components		Total	Resident types										Aberrant types												
				Laguna Brown	Laguna Fine Orange	Laguna Fine Cream	Eslabones Red	La Salta Black	Pueblito Brushed	Pueblito Plain	La Salta Polished	Los Angeles Brushed	Los Angeles Plain	Los Angeles Black	El Prisco Black	Zaquil Black Incised (Engraved)	Zaquil Red	Nogales Neck-banded	Tancol Black-on-Red	Panuco Gray	Huastera Black-on-White	Tancol Brown-on-Buff	Tancol Polychrome	Possible Panuco Period VI Sherds	Panuco Heavy Plain	Los Flores Molcajete Fine Paste	Leland Incised
Los Angeles	Tm c 81, layer 1	number	142				1	1	2	3	5	94	12	22								1		1			
		percentage	1.00				.01	.01	.01	.02	.03	.66	.08	.16								.01		.01			
	Tm c 82, layer 1	number	40					1			2	18	12	2						1	1		1	2			
	Tm c 314, layer 1	number	416				3	4	5	23	21	138	97	60		10				2	27	11	2	7	1	4	1
		percentage	1.00				.01	.01	.01	.06	.05	.33	.23	.14		.02				.01	.06	.03	.01	.02	.00	.01	.00
	Tm c 82, layer 2	number	101				2	3	6	19	21	15	17	2				1	1	6	1	5	2				
		percentage	1.00				.02	.03	.06	.19	.20	.15	.17	.02				.01	.01	.06	.01	.05	.02				
	Tm c 83, level 1	number	49						1	2	3	10	27	1				4			1						
	Tm c 83, levels 2–3	number	82						1	8	2	58	8					4									
	Total Los Angeles sherds		830				6	9	15	55	54	333	173	87		10		9	1	8	31	18	5	10	1	4	1
	Percentage of Los Angeles Types		1.00				.01	.01	.02	.07	.06	.41	.21	.10		.01		.01	.00	.01	.04	.02	.01	.01	.00	.00	.00
La Salta	Tm r 78, house 1	number	626				7	33	228	259	99																
		percentage	1.00				.01	.05	.36	.42	.16																
	Tm r 79, level 1	number	479					77	106	223	73																
		percentage	1.00					.16	.22	.47	.15																
	Tm c 314, layer 2	number	59				1	5	7	10	32					3	1										
	Tm r 79, level 2	number	442				6	85	91	148	112																
		percentage	1.00				.01	.19	.21	.38	.25																
	Tm r 78, house 2	number	160				10	21	31	56	42																
		percentage	1.00				.07	.13	.19	.35	.26																
	Total La Salta sherds		1766				24	221	463	696	358					3	1										
	Percentages of La Salta Types		1.00				.01	.13	.26	.40	.20					.00	.00										

TABLE 10—*Continued*

Phase	Excavated components		Total	Resident types								Aberrant types														
				Laguna Brown	Laguna Fine Orange	Laguna Fine Cream	Eslabones Red	La Salta Black	Pueblito Brushed	Pueblito Plain	La Salta Polished	Los Angeles Brushed	Los Angeles Plain	Los Angeles Black	El Prisco Black	Zaquil Black Incised (Engraved)	Zaquil Red	Nogales Neck-banded	Tancol Black-on-Red	Panuco Gray	Huasteca Black-on-White	Tancol Brown-on-Buff	Tancol Polychrome	Possible Panuco Periods (VI) Sherds	Panuco Heavy Plain	Los Flores Molcajete Fine Paste	Leland Incised
Eslabones	Tm r 86, levels 1–2	number	119				9	14	22	53	21																
		percentage	1.00				.08	.11	.18	.45	.18																
	Tm r 6, levels 1–3	number	3222				210	517	908	842	745																
		percentage	1.00				.07	.16	.28	.26	.23																
	Tm r 79, levels 3–4	number	300				18	65	88	68	61																
		percentage	1.00				.06	.22	.29	.23	.20																
	Tm c 81, layer 2	number	75				16	6	7	23	16	1	4	1				1									
	Tm r 86, level 3	number	954				93	202	186	254	219																
		percentage	1.00				.10	.21	.19	.27	.23																
	Tm c 82, layer 3	number	33				9	1	1	5	8								9?								
	Total Eslabones sherds		4703				355	805	1212	1245	1070	1	4	1				1	9								
	Percentages of Eslabones Types		1.00				.08	.17	.26	.26	.23	.00	.00	.00				.00	.00								
Laguna	Tm r 86, level 4	number	1033				148	387	198	92	208																
		percentage	1.00				.14	.38	.19	.09	.20																
	Tm r 86, level 5	number	335				52	146	61	25	51																
		percentage	1.00				.16	.44	.18	.07	.15																
	Tm r 86, level 6	number	259			2	25	84	78	42	28																
		percentage	1.00			.01	.10	.32	.30	.16	.11																
	Tm r 88, levels 1–2	number	382				115	85	90	53	39																
		percentage	1.00				.30	.22	.24	.14	.10																
	Tm r 172, levels 1–3	number	1560	49	73	203	517	31	402	208	69				4	4											
		percentage	1.00	.03	.05	.13	.34	.02	.26	.13	.04				.00	.00											
	Tm c 174, layer 1	number	11				8	1			1		1														
	Total Laguna sherds		3580	49	73	205	865	734	829	420	396		1		4	4	1	1	10	8	31	18	5	10	1	4	1
	Percentages of Laguna Types		1.00	.02	.02	.06	.24	.21	.23	.12	.10		.00		.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Total Excavated Sherds			10,879	49	73	205	1250	1769	2519	2416	1878	334	178	88	4	17	1	10	10	8	31	18	5	10	1	4	1

TABLE 10—*Continued*

Phase	Surface components		Total	Resident types											Aberrant types													
				Laguna Brown	Laguna Fine Orange	Laguna Fine Cream	Eslabones Red	La Salta Black	Pueblito Brushed	Pueblito Plain	La Salta Polished	Los Angeles Brushed	Los Angeles Plain	Los Angeles Black			Zaquil Red				Huastera Black-on-White	Tancol Brown-on-Buff		Possible Panuco Period (VI) sherds				
Los Angeles	Tm c 293	number	3									2		1														
	Tm c 327	number	23									9	14															
	Tm c 326	number	50									31	10	8								1						
	Tm c 325	number	2									2								3?								
	Tm c 320	number	3									1	1	1														
	Tm c 316	number	77									68	8	1														
	Tm c 311	number	127									33	83	6			2						3					
	Tm c 294	number	4									4																
	Tm c 292	number	18									11	7															
	Tm c 290	number	11									10	1															
	Tm c 288	number	13									3	1										9					
	Tm c 222	number	9									5	3	1														
	Tm c 221	number	12										11										1					
	Tm c 198	number	42									11	10	14									7					
	Tm c 197	number	110									100	4	6														
	Tm c 84	number	6									5	1															
	Tm c 220	number	15									10	5															
	Tm c 312	number	135									20	104	9				2										
	Total Los Angeles sherds		660									325	263	47			2	2			3?	1	20					
	Percentages of Los Angeles Types		1.00									.50	.40	.07									.03					
La Salta	Tm c 289	number	5							1	4																	
	Tm r 322	number	385				5	4	136	143	97																	
	Tm r 323	number	468				17	58	138	173	78		4															
	Tm r 90	number	84					1	4	37	42																	
	Total La Salta sherds		942				22	63	278	354	221		4															
	Percentages of La Salta Types		1.00				.02	.07	.29	.38	.23		.01															
Eslabones	Tm r 311a	number	75				4	13	36	15	7																	
	Tm r 304	number	221				8	34	58	78	43																	
	Total Eslabones sherds		296				12	47	94	93	50																	
	Percentages of Eslabones Types		1.00				.04	.16	.32	.31	.17																	
Laguna	Tm r 188	number	3				3																					
	Tm r 186	number	8				4		2	2																		
	Tm r 185	number	5				5																					
	Tm r 328	number	9				4			5																		
	Tm r 338	number	18				9				1	8																
	Tm r 187	number	113				14	1	24	67	7																	
	Tm r 262	number	60				8	3	7	41	1																	
	Tm r 310	number	480			2	53	25	171	199	30																	
	Tm r 301	number	269				23	2	87	147	10																	
	Tm r 324	number	774			2	114	17	176	436	29																	
	Tm r 302	number	254		1	2	58	10	94	84	5																	
	Tm r 223	number	39			1	4	6	10	11	7																	
	Tm r 196	number	30			1	6	2	10	10	1																	
	Tm r 195	number	48		2	2	9	2	27	4	2																	
	Tm r 194	number	80	11	8	10	17	2	4	21	7																	
	Total Laguna sherds		2190	11	11	20	331	70	612	1027	100	8																
	Percentages of Laguna Types		1.00	.01	.01	.01	.15	.03	.28	.47	.04	.00																
Total Surface Sherds			4088	11	11	20	365	180	984	1474	371	333	267	47			2	2			3?	1	20					
Grand Total Sherds			14,967	60	84	225	1615	1949	3503	3890	2249	667	445	135	4	17	3	12	10	8	31	19	5	30	1	4	1	

TABLE 11

Distribution of Features of Vessel Form in the Sierra de Tamaulipas

Phase	Excavated components / Surface components	Total vessel feet	Total rims	Vessel forms indicated by rim types																Vessel (molcajete) feet		
				Basal ridged bowl—Nos. 18–21 of fig. 37	Thickened lip olla—Nos. 37, 38, 43 of fig. 37	Vertical recurved rim bowl—Nos. 17, 29, 33 of fig. 37	Effigy vessel	Outflaring necks at an angle to body olla—Nos. 34–36 of fig. 37	Thickened lip bowl—Nos. 1, 10, 16a of fig. 37	Plate—Nos. 41–42 of fig. 37	Incurved rim bowl—Nos. 22–25 of fig. 37	Straight-sided outsloping carinated bowl—Nos. 2–7 of fig. 37	Hemispherical bowl—Nos. 26–28, 47, 49 of fig. 37	Outflaring outsloping carinated bowl—Nos. 8, 9, 12–16, 48 of fig. 37	Outcurving neck olla—Nos. 29–33, 44 of fig. 37	Short vertical sided carinated bowl—No. 11 of fig. 37	Short vertical neck olla—Nos. 39–40 of fig. 37	Outflaring rim thickened lip olla—Nos. 45–46 of fig. 37	Long vertical neck olla—Nos. 50–51 of fig. 37	Short conical solid	Solid nubbin	Short conical hollow
Los Angeles	Tm c 81, layer 1		20								5		2		4			2	7			
	Tm c 82, layer 1		5								1		1		1				2			
	Tm c 82, layer 2		7								2			1	2				2			
	Tm c 314, layer 1		25								9		3		7		1	4	1			
	Tm c 326		1															1				
	Tm c 316		2															2				
	Tm c 311		9									1	4	1	1		1		1			
	Tm c 197		13												1				12			
	Tm c 220		1																1			
	Tm c 312		1												1							
	Tm c 83, level 1		3												1				2			
	Tm c 83, levels 2–3		7								3				1				3			
	Total Los Angeles rim sherds		94								20	1	10	2	19		2	9	31			
La Salta	Tm c 289		1									1										
	Tm r 322		8					1					1	2	1		3					
	Tm r 78, house 1	4	75				1	2		4	2	6	14	31	7		8				1	3
	Tm r 79, level 1	10	48					2		6	4	8	8	15	1	2	2				2	8
	Tm c 314, layer 2	1	5									2		2	1							1
	Tm r 323	7	51			1		1	1		3	8	6	27	3		1				4	3
	Tm r 79, level 2	8	41			1		2		4	3	5	8	13	3	1	1				3	5
	Tm r 78, house 2	1	5										1	3	1						1	
	Total La Salta shape sherds	31	234			2	1	8	1	14	12	32	38	93	17	3	15				11	20
	Percentages of La Salta forms	1.00	1.00			.01	.00	.04	.00	.06	.05	.14	.16	.40	.07	.01	.06				.35	.65
Eslabones	Tm r 311a	2	8										4	3	1						2	
	Tm r 86, levels 1–2	3	8					2	1		1	1		3							1	2
	Tm r 304	3	55					1		14		11	19	8	2						3	
	Tm r 6, levels 1–3	66	174	2		2	4	9	8	10	5	32	15	66	21					19	14	33
	Tm r 79, levels 3–4	5	27		1			3		5	2	6	2	7	1					1	2	2
	Tm c 81, layer 2	1	1									1									1	
	Tm r 86, level 3	12	80		1	2		14	2	3	9	15	2	30	2					1	4	7
	Tm c 82, layer 3		2										1	1								
	Total Eslabones shape sherds	92	355	2	2	4	4	29	11	32	17	66	43	118	27					21	27	44
	Percentages of Eslabones forms	1.00	1.00	.00	.00	.01	.01	.08	.03	.09	.05	.20	.13	.33	.07					.23	.29	.48
Laguna	Tm r 216	2	1	1																2		
	Tm r 86, level 4	13	85	3	1	5		5	1	7	10	10	11	25	7					10	2	1
	Tm r 86, level 5	3	34	1		1		3	2	1	5	2	7	10	2					3		
	Tm r 86, levels 6–7	2	19	1		1		4	3	2	1	3	1	3						2		
	Tm r 310	1	47	1		1		3		2	1	5	1	32	1					1		
	Tm r 301	4	16								1	4	1	10						4		
	Tm r 324	17	52	3				2		1	4	7	4	31						10	5	2
	Tm r 88, levels 1–3	5	49	2	2	2		2			8	2	1	27	3					4		1
	Tm r 302	5	26	1		1					1	1	2	20						4	1	
	Tm r 223	4	2	1							1									4		
	Tm r 195	1	21	1	13	2					1	3	1							1		
	Tm r 194	4	4	1	1		1							1						4		
	Tm c 172, levels 1–3	27	171	19	13	29	2	44	7	8	6	29		14						27		
	Tm c 174, layer 1		1		1																	
	Total Laguna shape sherds	88	528	35	31	42	3	63	13	21	39	66	29	173	13					76	8	4
	Percentages of Laguna forms	1.00	1.00	.07	.06	.08	.00	.12	.02	.04	.07	.13	.06	.33	.02					.86	.09	.05
Grand Total of Shape Sherds		211	1211	37	33	48	8	100	25	67	68	164	110	384	57	3	17	9	31	97	46	68

TABLE 12

DISTRIBUTION OF LINED DECORATION IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components Surface components	Total lined decoration	Total incised lines	Total engraved lines	Interior bottom incised decoration motifs							Exterior rim engraved decoration motifs									
					Criss-cross lines	Parallel straight lines	Parallel lines in quadrants at oblique angles to those in the next	Parallel lines in quadrants at right angles to those in the next	Parallel chevrons	Concentric circles or spirals	Radiating lines like spokes	Engraved straight lines	Single or concentric diamonds	Four parallel lines forming V's and inverted V's	Zigzag lines	Triangles filled with cross-hatched lines	Triangles filled with parallel lines	Opposed triangles with one with cross-hatching and the other parallel lines	Parallel chevrons	Single stepped pyramids filled with vertical parallel lines	Opposed stepped pyramids filled with vertical parallel lines
La Salta	Tm r 322	1		1								1									
	Tm r 78, house 1	36	11	25		4	2	5						22				1		2	
	Tm r 79, level 1	22	3	19		1		1	1					9			2			4	3
	Tm r 323	11	9	2		5	2	2				2							1		
	Tm r 79, level 2	8	3	5			1	1	1					2			1			1	
	Tm r 78, house 2	4		4										2						2	
	Total La Salta lined decorated sherds	82	26	56		10	5	9	2			3		35			3	1	2	9	3
	Percentages of La Salta decorated types	1.00	.32	.68		.12	.06	.11	.03			.03		.43			.03	.01	.03	.11	.04
Eslabones	Tm r 311a	2	1	1		1						1									
	Tm r 86, levels 1–2	6	3	3			1	1	1			2		1							
	Tm r 304	7	6	1			6					1									
	Tm r 6, levels 1–3	89	49	40			25	11	11	1	1	13		19	1	1	5	1			
	Tm r 79, levels 3–4	3	3			1	1	1													
	Tm c 81, layer 2	2	2			1	1														
	Tm r 86, level 3	44	28	16		14	6	5	2	1		16									
	Tm c 82, layer 3	2	2			2															
	Total Eslabones lined decorated sherds	155	94	61		19	40	18	14	2	1	33		20	1	1	5	1			
	Percentages of Eslabones decorated types	1.00	.60	.40		.12	.26	.12	.09	.01	.00	.21		.13	.01	.01	.03	.01			
Laguna	Tm r 86, level 4	56	38	18		22	7	3	6			3	2	13							
	Tm r 86, level 5	26	21	5		3	15	2	1			4		1							
	Tm r 86, levels 6–7	4	4			1	3														
	Tm r 310	1	1		1																
	Tm r 301	1	1			1															
	Tm r 324	16	16			14	1	1													
	Tm r 88, levels 1–2	23	23			3	14	2	4												
	Tm r 302	8	8		4	4															
	Tm r 194	2	2			2															
	Tm r 172, levels 1–3	44	44			21	12	9	2												
	Total Laguna lined decorated sherds	181	158	23	5	71	52	17	13			7	2	14							
	Percentages of Laguna decorated types	1.00	.87	.13	.03	.39	.29	.09	.07			.04	.01	.08							
Grand Total of Lined Decorated Sherds		418	278	140	5	100	97	44	29	2	1	43	2	69	1	1	8	2	2	9	3

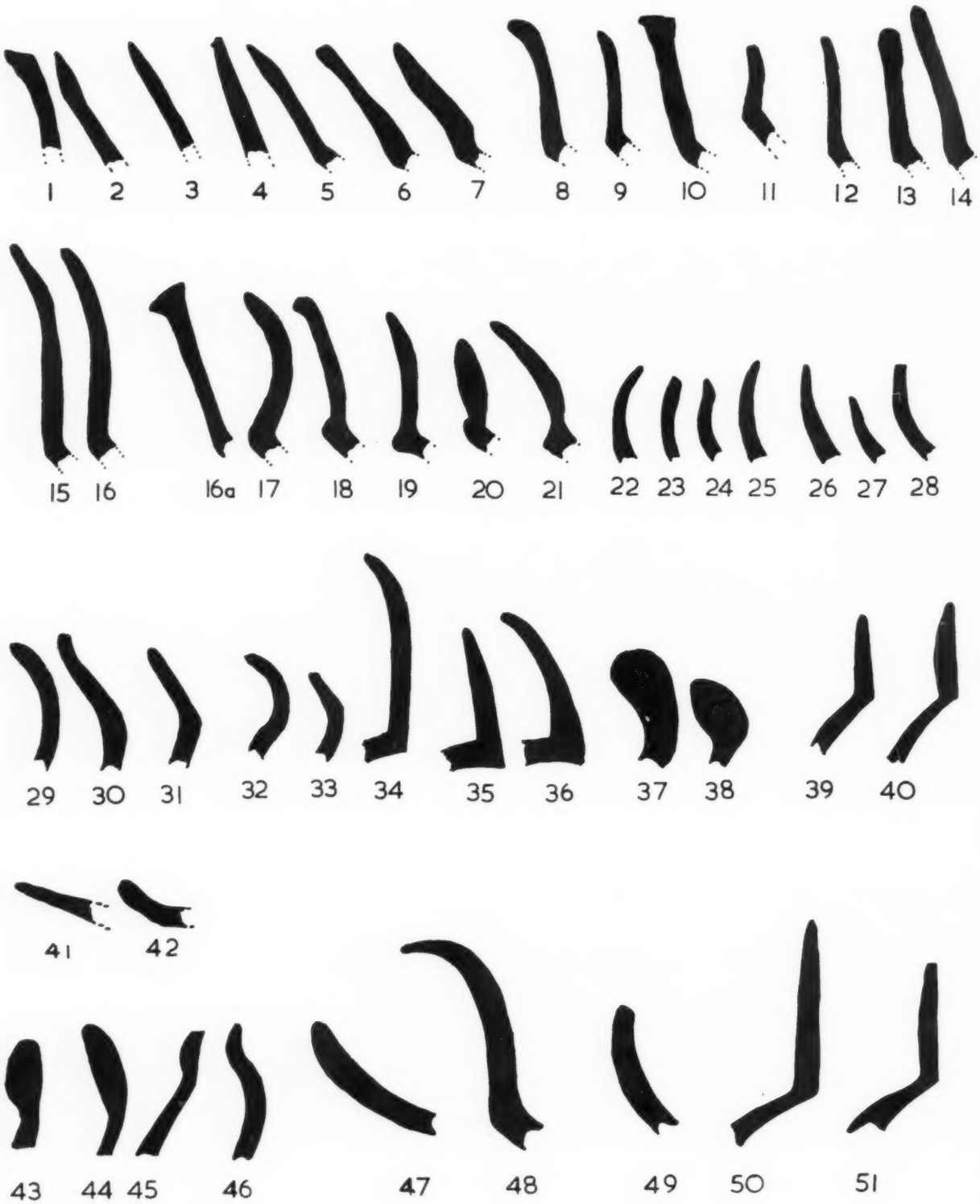

FIG. 37. Rim cross-sections (interiors to the right).

to La Salta times, while in the Los Angeles Phase there are no locally-made decorated sherds. The proportion of bowls to ollas (4 to 1) is about the same from Laguna to La Salta times, but in the Los Angeles Phase rim fragments of ollas are more numerous than those from bowls (65 to 33). This shift in decoration and in vessel forms from the earlier phases to Los Angeles is paralleled by a shift in the use of pots. As almost half the Los Angeles sherds from cave excavations had adhering carbon, they were obviously used mainly for cooking. Some, of course, may have been used for storage and water carrying, and a few for food. However, none were used for *chili* grinding, and it is very doubtful that any had a decorative or ceremonial purpose.

In conclusion, it seems worth while speculating about the cultural implications of these ceramic trends. I have the general impression that a formative period Meso-American ceramic complex initially entered this area. Gradually it was forced to abandon its more aesthetic features as the environment became harsher and the food supply diminished. Finally, during Los Angeles times, conditions became so severe that only the most useful, most necessary types of pots were slapped together with the least possible expenditure of time and energy.

POTTERY TYPES

Laguna Brown

Only sixty sherds were found.

Paste: The temper of this type is small pieces of limestone and sand. The paste is fairly well knit, but laminations and holes (where the limestone has leached out) occur. In hardness it is about 3.6. In color the interiors are grey to dark grey and only lighten to a cream color right at the surface. Sherds are about 8 to 10 mm. thick.

Surface finish: Surfaces have been painted light brown and then polished.

Decoration: None.

Vessel form: All fifteen rims come from ollas. (fig. 37, no. 34–36).

Temporal and spatial range: This type is confined to the Laguna Phase at Tm r 172 and Tm r 194 in the Sierra de Tamaulipas.

Relationship: I suspect this type is ancestral to La Salta Polished. In a general way it is similar to the brown sherds that are included in the El Prisco Black type at Panuco.[212]

Laguna Fine Orange

Based on a sample of eighty-four sherds.

Paste: This ware has no temper, and the paste is fine-grained and well consolidated. In cross-section the sherds are grey in their interiors and turn to orange near their surfaces. In hardness they are over 4. Sherds are about 7 mm. thick.

Surface finish: The sherds have been painted red or orange and then polished.

Decoration: Only one small sherd is decorated, and it has two parallel lines that have been cut through its surface after firing and polishing.

Vessel form: As only six rim sherds occurred, nothing very definite can be said. Except for two sherds with a basal ridge on their exteriors (fig. 37, no. 18) the other four vessel forms are represented by only one sherd apiece. These show one incurved rim of a bowl (fig. 37, no. 25), one recurved outward (fig. 37, no. 17), one outflaring (fig. 37, no. 29), and one that is roughly straight (fig. 37, no. 4).

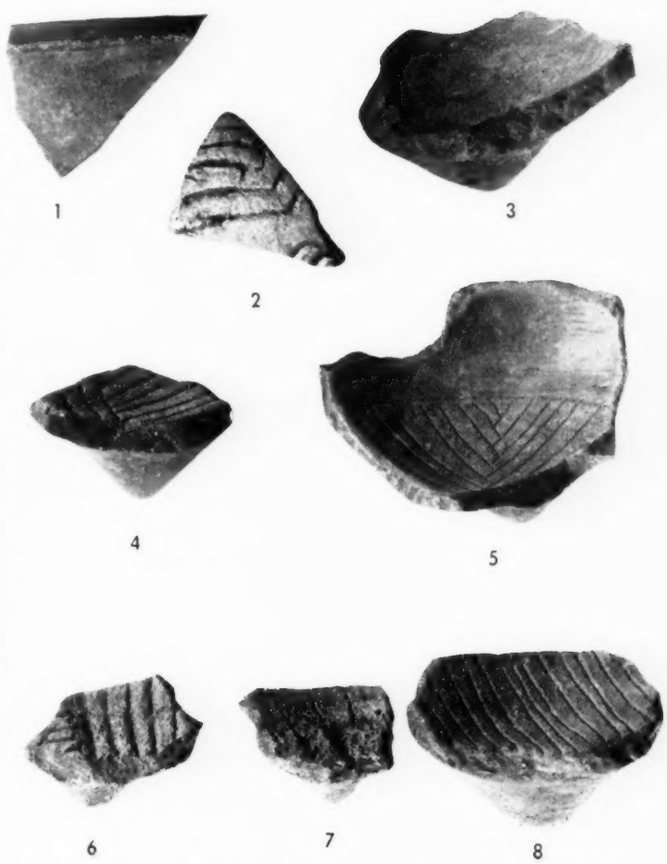

FIG. 38. Decorated sherds and vessel feet (1/2 natural size). 1. Thickened lip rim (from Tm r 172). 2. Exterior incising (from Tm r 172). 3. Large, conical and hollow vessel foot (from Tm r 79). 4. Parallel incised lines at oblique angle to parallel lines on the interior of a bow with large, conical, and solid vessel foot (from Tm r 86). 5. Parallel incised chevrons on interior of bowl with small, conical, and solid vessel foot (from Tm r 6). 6. Parallel incised lines at right angle to parallel incised lines on interior of bowl with small, conical, and solid vessel foot (from Tm r 6). 7. Parallel incised lines on interior of bowl with small, conical, and solid vessel foot (from Tm r 86). 8. Parallel incised lines on interior of bow with large, conical, and solid vessel foot (from Tm r 88).

[212] Ekholm, 1944.

Temporal and geographical range: This type was found only at Tm r 172, Tm r 194, and Tm r 302 of the Laguna Phase in the southern and western Sierra de Tamaulipas.

Relationships: The type is similar to what Ekholm called Fine Redware at Panuco.[213] However, I feel that both his specimens and mine come from some outside source, perhaps farther south and west.

Laguna Fine Cream

Based on 225 sherds.

Paste: The paste is almost identical to that of Laguna Fine Orange.

Surface finish: The exterior of this type bears a thin cream-colored slip that has been highly polished.

Decoration: None found.

Vessel form: The majority of rim sherds have a basal ridge at the junction of their base and rim or side (fig. 37, no. 18–21). All are low bowls. Besides the rims with a basal ridge, incurved-rim bowls (fig. 37, no. 22–25), outflaring bowls (fig. 37, no. 8, 12–19), recurved-rim bowls (fig. 37, no. 17, 29, and 33), straight-rim bowls (fig. 37, no 1–5), and outflaring-rim ollas with thickened lips occur (fig. 37, no. 29–33).

Temporal and geographical range: The sherds of this type occurred at early Laguna sites (Tm r 172, 194, 195, 196, 223, 302, 324, 310, and Levels 6–7 of Tm r 86 in the Sierra de Tamaulipas).

Relationships: The paste and surface finish are unlike any I have seen. However, the basal-ridge vessel form and the thickened-lip bowls are rather similar to what appear in the El Prisco (II) Period at Panuco.[214]

Eslabones Red

This description is based on a study of 1,615 sherds.

Paste: The temper consists of fine grit in medium amounts, though large pieces may occur. This is particularly true of the sherds from the Laguna site. The paste is porous. The firing is uneven, the interiors of some sherds being fired orange while those of others are black. Hardness is about 3.9. Thickness ranges from 7 to 15 mm.

Surface finish: Surfaces are painted red and polished, and a few give the appearance of having been slipped, but close examination reveals that this is due to firing and not to slipping.

Decoration (fig. 38, no. 1–8): The interior bottoms of bowls often bear molcajete incising (81 sherds). The area decorated seems to be circular and conforms to the bottom of the bowl. This decoration has as its basic design element a series of parallel (about 15 mm. apart) incised lines (about 2 mm. wide and deep). The bottoms of the bowls seem to have been divided into sections (quadrants) and the parallel lines of one section are at a right (16) or oblique (40) angle to the lines in the next section. A few (4) bottoms bear incised chevrons. One sherd from Tm r 6 has an engraved chevron on the exterior rim.

Vessel form: There seems to be some change within the type in regard to vessel form. In the early stage of this type the dominant form seems to be outflaring-necked ollas (fig. 37, no. 36, 34, and 35) and thickened lip ollas (fig. 37, no. 37). The other forms present in the early stage are basal ridged bowls (fig. 37, no. 18, 19, 20, and 21) or bowls with outflaring sides (fig. 37, no. 8, 9, 12–16). Hemispherical bowls (fig. 37, no. 22, 23, and 25), incurved rim bowls (fig. 37, no. 27, 26, and 28), vertical recurved rim bowls (fig. 37, no. 17), and straight-side outsloping-sided bowls (fig. 37, no. 2, 5, and 7) are present but relatively rare. In Eslabones and La Salta times, outflaring carinated bowls (fig. 37, no. 12, 16, 8, 9, 13, and 14) are the dominant form, and incurved rim (fig. 37, no. 27, 28, and 26) and outsloping straight-sided carinated (fig. 37, no. 5, 3, 4, 6, and 7) are common. Ollas (fig. 37, nos. 34, 36, 33, and 40) are rare.

Appendages: Many of the bowls (thirty-six) have tripod feet. Most (twenty-seven) of these feet are solid, short (about 25 to 50 mm. long), and conical.

Temporal range: This is the dominant type in the early part of the Laguna Phase; it is on the wane during Eslabones times and dies out in the La Salta Phase.

Geographical range: This type runs across the northern Sierra de Tamaulipas from Ciudad Victoria to San José de las Rusias.

Relationships: In a very general way this type is similar in paste to some of the red-covered Heavy Plain sherds from Panuco. The short, solid conical feet, the bowls with basal ridges, and the interior molcajete-like incised designs are ceramic features of this type that are identical to those found on El Prisco (II) Period sherds at Panuco, Vera Cruz.[215]

La Salta Black

This study was made on 1,949 sherds of this type.

Paste: The temper consists of finely-ground rock in large amounts. The paste is porous and occasionally laminated. Some of the earlier sherds of this type from Laguna are more noticeably laminated, and the paste is coarser, but this is not a one-to-one correlation. The firing is often poor with the interior black from surface to surface, but show some lightness in color near the edges. Hardness is about 3.5. Sherds vary in thickness from 5 to 15 mm.

Surface finish: Sherds are usually slipped except on the bottom exterior. After slipping with a dark clay they were blackened and polished.

Decoration (fig. 39): Two kinds of decoration appear on this type. In the Laguna and Eslabones Phases, both

[213] Ekholm, 1944, *see* section on ceramics.

[214] *Ibid.*

[215] *Ibid.*, fig. 5.

incising on the interior and engraving on the exterior and interior occur, but by La Salta times only exterior engraving is present. The incising on the interior is identical to that described for the Eslabones Red type.

The engraving is of a number of different kinds. The most popular kind is on the exterior rims of carinated bowls and consists of four parallel engraved lines running obliquely in opposition to four other parallel engraved lines; these form a series of V's and inverted V's. A design almost as popular are chevrons. Another design is a series of triangles with one side of the triangle represented by three parallel lines and the rest of the triangle filled with parallel lines running in the opposite direction. The next most popular design (appearing only in La Salta) are small stepped pyramids filled with vertical parallel engraved lines. These appear either with their apexes at the tip of the vessel or in opposition to one another with alternate ones having the bases of the pyramids at the lip. Other designs include single engraved lines near the lip and parallel engraved lines on the interior bottoms. One engraved diamond pattern occurred.

Vessel form: The dominant form of the La Salta Black type is a carinated bowl with straight or outflaring sides (fig. 37, no. 12, 8, 9, 10, 13, 15, 16, and 4, 5, 6, 7, 3, and 2). Common in Laguna times were hemispherical bowls (fig. 37, no. 22–25), and incurved rim bowls were popular in all three phases (fig. 37, no. 26–28). In the later phases a few others forms appear, such as recurved rim bowls (fig. 37, no. 17, 29, and 33), small ollas with angled outflaring necks (fig. 37, no. 35 and 36), and straight-necked ollas (fig. 37, no. 39).

Appendages: Feet rarely occur, but a few solid ones are present in the Laguna Phase; large, solid, nubbin, and hollow ones in the Eslabones Phase; and mainly hollow ones in the La Salta Phase.

Temporal range: This type appears in the Laguna, Eslabones, and La Salta Phases. It reaches its dominance in the later part of the Laguna Period and continues in large popularity into the early part of the Eslabones Phase.

Geographical range: All of the Sierra de Tamaulipas and perhaps southwest Tamaulipas.

Relationships: This type seems related to El Prisco Black and Zaquil Black of the Panuco region, but it is far from being the same type.[216] Its closest ties seem to be with various types in southwest Tamaulipas and northwest San Luis Potosí, such as Du Solier found at the Buena Vista site, Huaxcama, San Luis Potosí.[217] In terms of vessel form and the use of engraving, it has a vague resemblance to some of the Caddo ware from east Texas.[218]

[216] Ekholm, 1944: 345 and 352–354.

[217] Du Solier, Griffin, and Krieger, 1947: pl. II, A (*k, n*) and B (*c, s*).

[218] *Ibid.*, 28.

Pueblito Brushed

Of this type 3,503 sherds were examined.

Paste: The large temper is limestone and/or grit, about 3 mm. in diameter, and it appears in medium amounts. The paste is very porous and contorted, and the firing is poor and uneven, with sherd interiors being black to grey and outer surfaces brown to grey. Hardness is about 2.7, and sherds average about 15 mm. in thickness.

Surface finish: The outer surfaces have been brushed with grass or small twigs. The inner surface is smooth. The brushing is either horizontal or vertical, horizontal brushing being slightly more common in all phases. A few sherds of the later stages of this type show vertical brushing on the neck and horizontal brushing on the body.

Decoration: None.

Vessel form: Bowls with straight-sided outsloping rims (fig. 37, no. 3, 2, 6, 7, 4, and 5) and ollas with outflaring necks that blend into globular bodies with a flat base (fig. 37, no. 29–33) are the dominant forms of this type. Carinated bowls with outflaring rims (fig. 37, no. 8, 9, 10–16) and plates (fig. 37, no. 41, 42), are slightly less common. There are a few recurved rim bowls (fig. 37, no. 17), and a few ollas with angled-neck (fig. 37, no. 34–36). Ollas with thickened lips occur only during the Laguna Phase.

Appendages: A number of the bowls have stirrup type handles that extend up from the lip.

Temporal range: Mainly Laguna, Eslabones, and La Salta Phases with a few sherds occurring in Los Angeles components.

Geographical range: Sierra de Tamaulipas.

Relationships: This type is very similar to the brushed varieties of Heavy Plain at Panuco that start in the El Prisco (II) Period and run to historic times,[219] and is extremely similar to Palmillas and Infiernillo Brushed in southwest Tamaulipas.

Pueblito Plain

Of this type 3,890 sherds occurred.

Paste: The temper is small and occurs in large amounts. It is of grit or fine grains of sand, and the sherds have a definitely sandy feel. The paste is fairly compact but porous. Cross-sections reveal that the firing is fairly even with interiors being black or grey, changing abruptly to a brown near the surfaces. Hardness is about 3.5, and the average thickness is about .8 mm.

Surface finish: Surfaces are smooth.

Decoration: A few interior bottoms of vessels are decorated by incising in a style similar to La Salta Black.

Vessel form: Almost the whole range of vessel forms of the Sierra de Tamaulipas occurs in this type. Occur-

[219] Ekholm, 1944.

ring (in order of frequency) are ollas with outcurved necks (fig. 37, no. 29–33) or with necks at an angle to the bodies (fig. 37, no. 34–38), carinated vessels with recurved vertical (fig. 37, no. 17), outflaring (fig. 37, no. 8, 9, 10–16, and 48), or straight outsloping rims (fig. 37, no. 2–7), incurved rim bowls (fig. 37, no. 22–28), bowls with thickened lips (fig. 37, no. 1, 10, 16*a*), bowls with a basal ridge (fig. 37, no. 18–21), hemispherical bowls (fig. 37, no. 26–28, 47, 49), plates (fig. 37, no. 41, 42), and vertical necked ollas (fig. 37, no. 39, 40, and 50).

Appendages: Three strap handles and few tripod feet occur. The feet of the Laguna Phase are mainly large, solid, and conical, while the others in the Eslabones and La Salta Phases are hollow and conical and have small solid nubbins.

Temporal and spatial range: This type is present in the Laguna, Eslabones, and La Salta Phases in the northern part of the Sierra de Tamaulipas. The type reaches its greatest frequency in the La Salta Phase.

Relationships: Not determined.

La Salta Polished

Sherds of this type, numbering 2,249, were examined.

Paste: The paste of this type is about the same as that of Pueblito Plain.

Surface finish: The surfaces are unpainted but highly polished.

Decoration: Like Eslabones Red, this type has two kinds of decoration: engraved exteriors and incised molcajete-like interiors.

The incised (pre-firing incising) molcajete-like interiors occurring in Laguna, Eslabones, and La Salta Phases, have seven motifs (fig. 38).

(*a*) Incisions that divide the base into four quadrants with parallel incisions in each quadrant that are at right angles to those of the adjoining quadrants.
(*b*) Oblique incisions very similar to (*a*) except that no lines divide the sets of parallel lines into quadrants.
(*c*) Incisions that radiate from the centre like spokes.
(*d*) Incisions that are concentric circles.
(*e*) Chevron-like incisions.
(*f*) Parallel incised lines.
(*g*) Criss-cross lines.

The engravings (post-firing incising) occurring in the Eslabones and La Salta Phases are of seven different designs. They all occur on the outer rim and sides of vessels (fig. 39).

(*a*) Chevrons composed of four parallel lines.
(*b*) Cross-hatched triangles around the rim with apexes at the lip.
(*c*) Triangles filled with lines parallel to one side and usually having the other side composed of two or three parallel lines, with the base as a single line and the apex at the lip.
(*d*) Triangles as mentioned above, with the areas between the triangles filled with cross-hatching.
(*e*) Designs of parallel zigzag lines.
(*f*) Triangles composed of four parallel lines on the sides, single horizontal lines at the base, apexes being at the lip and the triangular centre undecorated.
(*g*) A single line paralleling the lip.

Vessel form: The wide variety of vessel forms occurring with Pueblito Plain occurs in this type also. In all periods, outflaring carinated bowls (fig. 37, no. 8, 9, 12–16, and 48), outsloping straight-sided bowls (fig. 37, no. 2–7), and recurved rim bowls (fig. 37, no. 17, 29, and 33) are the most common. In addition to these forms, small-mouthed ollas with vertical necks occur (and one is almost a bottle); bell-shaped vessels are present in considerable proportions in La Salta Phase tests, as are short- and vertical-sided carinated vessels. Furthermore, it is apparent that hemispherical bowls replace incurved rim bowls during the Eslabones Phase.

Appendages: Vessel feet usually occur with sherds having molcajete designs. There is a definite change within the type in that large solid conical feet occur in the Laguna Phase; large solid conical nubbin-like and hollow conical feet occur in the Eslabones Phase, and most of the feet in the La Salta Phase are hollow and conical. A few strap-handles occur in each phase.

Temporal range: This type, though present in the Laguna Phase, reaches its greatest frequency in the Eslabones and La Salta Phases.

Geographical range: Northern Sierra de Tamaulipas.

Relationships: In engraved design (usually of the La Salta Phase), this type resembles Zaquil Black Incised (Engraved) of the Zaquil Period (IV) at Panuco[220] and is similar to some Palmillas Engraved specimens from southwest Tamaulipas and Buena Vista, San Luis Potosí, of about the same time period.[221] In the shift in kinds of vessel feet and the replacement of incurved-rim bowls by hemispherical bowls, it closely parallels the shift at Panuco from the El Prisco (II) Period to the Zaquil (IV) Period.[222] In spite of these resemblances, however, it is a distinct type not definitely related to any other I know of.

[220] Ekholm, 1944: fig. 9x, and 353, 354.

[221] Du Solier, Griffin and Krieger, 1947: pl. II, A (*k, n*) and B (*e, s*).

[222] Ekholm, 1944.

FIG. 39. Engraved sherds (natural size). 1. Engraved V's on bowl (from Tm r 6). 2. Engraved V's on side of carinated bowl (from Tm r 79). 3. Engraved triangles filled with parallel lines opposed to ones filled with cross-hatching on side of carinated bowl (from Tm r 6). 4. Engraved stepped pyramids in opposition on neck of small-mouth olla (from Tm r 78). 5. Engraved triangles filled with parallel lines on neck of small-mouth olla (from Tm r 6).

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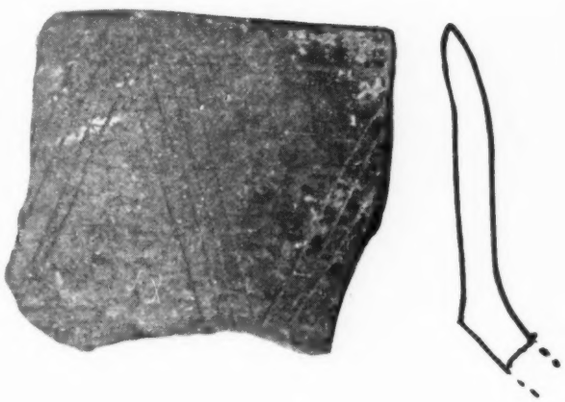

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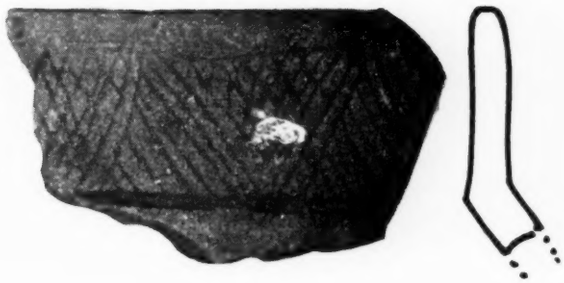

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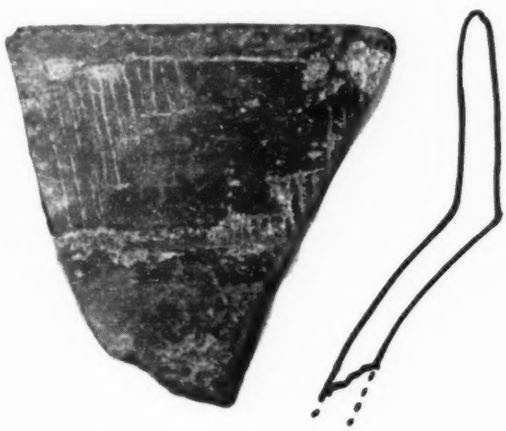

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FIG. 39.

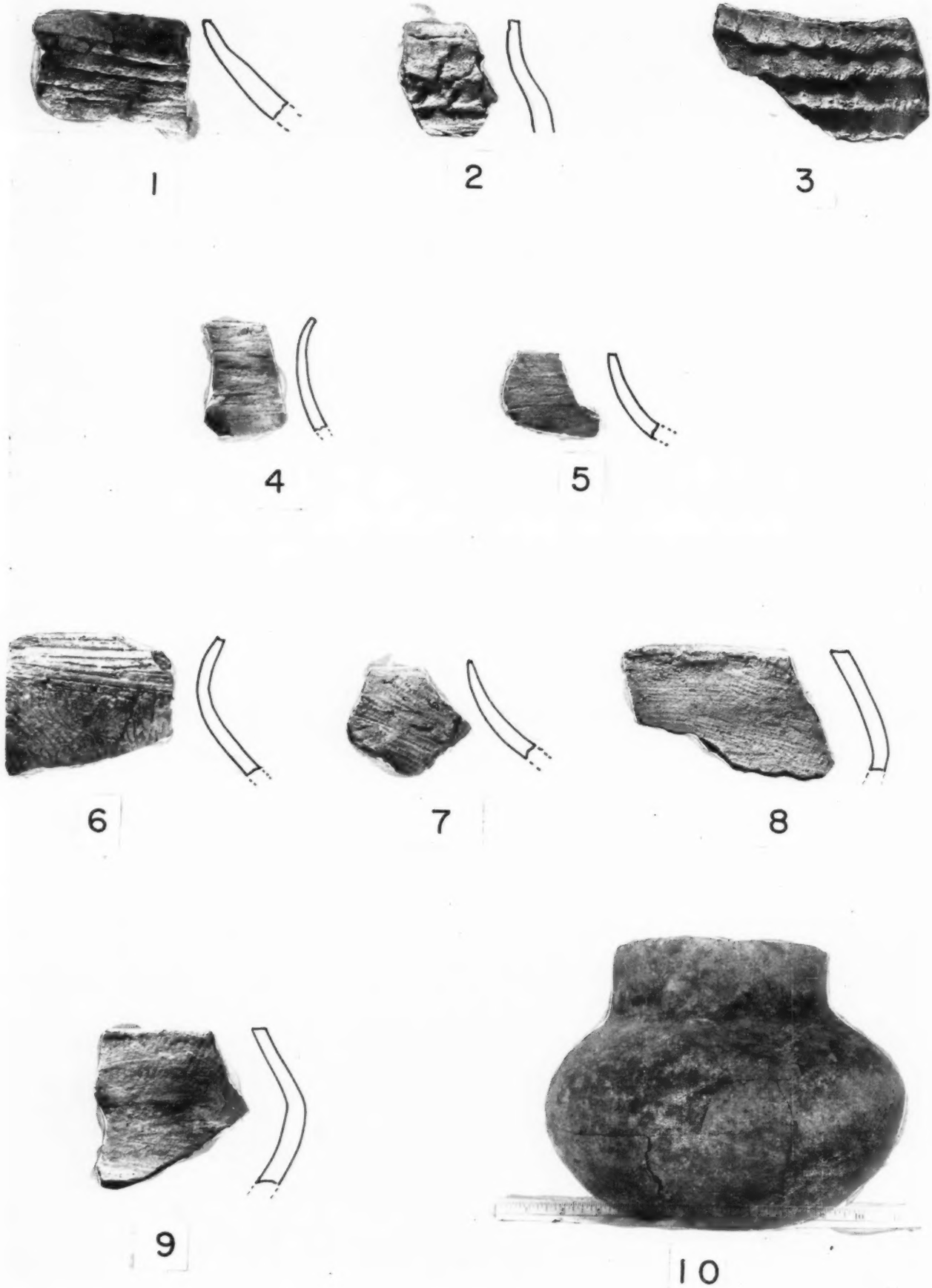


FIG. 40.

Los Angeles Brushed

Of this type, 667 sherds were studied.

Paste: The temper is mainly limestone which has a considerable range in size from 1 mm. to 10 mm. in diameter. Occasionally there are small pieces of grit (quartz or flint) about 10 mm. in size. The temper usually appears in very large amounts, often being as great in bulk as the clay. The paste is poorly knit and very porous and has a tendency to be flaky and crumbly. Cross-sections show that vessels were made by the coiling method. Color shows a considerable range, with surfaces being mainly orangish-brown, though dark brown to grey and black firing clouds appear. In cross-section, the interiors of sherds are usually grey to black. Firing seems to have been in poorly-controlled oxidizing atmosphere. Hardness is about 2.5. Vessel walls are about 7.5 mm. thick.

Surface finish: Exterior surfaces usually show rather deep, narrow, and parallel impressions. I suspect such impressions are the result of wiping or brushing the wet or damp clay vessel with handfuls of grass or fine twigs.

Vessel forms: Most of the sherds seem to have come from small-mouthed ollas, having a globular body and a round or sub-conoidal bottom (fig. 40, no. 19). The rims of such ollas are often long and vertical with a slightly thickened and rounded lip (fig. 37, no. 50), or they may be short or long, vertical-necked, with a flattened lip (fig. 37, no. 45 and 51), or outflaring with a rounded lip (fig. 37, no. 29–33). Less frequently, incurved-rim bowls (fig. 37, no. 22–25) occurred, as did one rim of a hemispherical bowl (fig. 37, no. 26–28).

Temporal range: Los Angeles Phase, slightly more prevalent in the later stages.

Geographical range: Canyon Diablo to Los Angeles region.

Relationships: It is clearly related to San Lorenzo Brushed of southwest Tamaulipas. As far as Tamaulipas is concerned, it may be a new type that moved into the region from the west during late prehistoric times or it may be a development from the older Pueblito Brushed type. If it is the latter, the transitional steps or types between the two are at present missing, and the changes must have been profound. The changes would include the decrease in the size of the temper, the making of a less compact paste, and a diminution of the number of vessel forms. In southwest Tamaulipas a similar transition did take place from Infiernillo Brushed to San Lorenzo Brushed. Perhaps such did occur in the Sierra de Tamaulipas, but it is not proved.

It is rather interesting to note the similarity of some of these sherds to the faintly striated types associated with Glaze III and IV at Pecos.[223]

Los Angeles Plain

Of this type of sherd 445 were analyzed.

Paste: About the same as Los Angeles Brushed.

Surface finish: The surface of this type of pottery appears to have been smoothed while the clay was still wet. On rare pieces may be seen a few faint scratches which reflect the tool used for the smoothing.

Vessel form: Most of the rim sherds are from small-mouthed ollas. Many have a long vertical neck with a rounded flattened lip (fig. 37, no. 51, 50); some have a short vertical neck with a thickened, rounded lip (fig. 37, no. 45, 46); and others an outflaring rim with a thickened lip (fig. 37, no. 29–33). A few rim sherds are from incurved-rim bowls (fig. 37, no. 24, 25), while one sherd seems to be part of a straight-sided outsloping bowl and two are from outflaring bowls.

Geographical range: Same as Los Angeles Brushed.

Temporal range: This type appears to be popular in the early part of the Los Angeles Phase and to diminish in the later stage.

Relationships: Possibly this type could be derived from Pueblito Plain but is related to San Lorenzo Plain of southwest Tamaulipas.

Los Angeles Black

About 135 sherds of this type were examined.

Paste: The temper is mainly grit or quartz ranging from ½mm. to 1 mm. in size. Occasionally small pieces of limestone are present. The temper is in medium amounts and not so well marked as in the other types of the Los Angeles ware. The consistency of the paste is poor, and the clay is poorly knit, being porous and tending to be laminated. The method of manufacture seems to have been coiling. The sherds, generally speaking, are black from surface to surface. On a few sherds, however, one surface may be slightly lighter than the interior or other surface. Such surfaces are either dark grey or, in one case, dark brown. Firing seems to have been in a reducing atmosphere. Hardness is around 2.5, and vessel walls are about 2.5 mm. thick.

Surface finish: Sherds usually bear a polished black surface on one or both sides. The actual surfaces are usually smoothed or wiped before polishing, and occasionally the imprint of the wiping material (grass?) may be faintly seen. The black polish seems to be the result of polishing the surface that had already been blackened by smudging and firing in a reducing atmosphere.

FIG. 40. Los Angeles Phase Pottery (all 1/2 natural size except 10, which is 1/5 size). 1. Nogales Corrugated (from Level 1, Tm c 83). 2. Nogales Corrugated (from Level 2, Tm c 83). 3. Nogales Corrugated (from Layer 2 of Tm c 82). 4. Los Angeles Black (from Layer 1, Tm c 81). 5. Los Angeles Black (from surface, Tm c 198). 6. Los Angeles Brushed (from Tm c 84). 7–8. Los Angeles Brushed (from Layer 1, Tm c 82). 9. Los Angeles Plain (from Tm c 84). 10. Los Angeles Plain (from Tm c 197).

[223] Kidder and Shepard, 1936: fig. 262.

Vessel form: Only a few rim sherds were found, and most of these are from small incurved-rim seed bowls (fig. 37, no. 22–25). A few others are parts of a hemispherical bowl (fig. 37, no. 27 and 47), and a couple are rims of flaring-necked ollas (fig. 37, no. 30, 31).

Geographical range: Confined to the area between the Canyon Diablo and the town of Los Angeles.

Temporal range: This (trial) type appears to be confined to the late part of the Los Angeles Phase.

Relationships: The only possible related type I know of is La Salta Black, but, except for the black color, few significant resemblances are evident. If they are related, a number of steps in the development are missing.

ABERRANT SHERDS

El Prisco Black

Four highly-polished sherds with a black slip, grit temper, and granular paste occurred at Tm r 172. These are El Prisco Black from the El Prisco Period in the Tampico–Panuco region.[224] They are evidence for the contemporaneity of the Laguna and El Prisco Phases.

Zaquil Black Incised

Thirteen sherds from Layers 1 and 2 of Tm c 314 may be classified as Zaquil Black Incised.[225] All have very fine grit temper in medium amounts. Their paste, though very slightly granular and sandy-feeling, is well knit. Their surfaces are slipped and well polished. Color ranges from a mahogany brown to black. Two of the sherds have a single engraved (post-firing incision) line paralleling the lip, while another has the ends of wide oblique lines (gadilloches) below the engraved line. All three rim sherds, which are probably from the same pot, are from a vertical-sided bowl with a rounded lip. In the Tampico–Panuco area these sherds are characteristic of the Zaquil (IV). Their presence in Layer 2 of Tm c 314 indicates that the Zaquil Period and La Salta Phase are of about the same time.

Zaquil Red

Three sherds have fine sandy temper, compact paste, and a thick red slip. Their surfaces are unevenly polished. They are the Zaquil Red type common to the Zaquil of Las Flores and Panuco Periods of the Tampico–Panuco area. Their presence in Levels 1 and 2 of Tm c 314 indicates that the La Salta and Los Angeles Periods are contemporaneous with the three mentioned above from the Huasteca.

Tancol Black-on-Red [226]

These ten sherds are from Tm c 82, Levels 2 and 3. They have a fine sandy temper and a compact paste and have been painted red on their exteriors. Geometric designs have been painted in black on top of the red. They occur in the Huasteca in the Panuco Period. In Tm c 82, Level 2, a Los Angeles component, was one sherd. Over-all evidence suggests that the nine sherds from Tm c 82, Level 3, an Eslabones component, must be intrusive.

Huasteca Black-on-White [227]

Thirty-one of these sherds occurred in Los Angeles Phase components. The temper is very fine-grained white grit in abundant amounts. The paste is well knit and extremely well fired. The surfaces have a greyish-white slip, and black decorations cover the slip. These Huasteca Black-on-White sherds, occurring in the Panuco Period in the Huasteca, indicate a contemporaneity of the Panuco and Los Angeles Phases.

Tancol Polychrome [228]

These sherds in paste and surface finish are like those described above. However, decoration is usually in three colors: black, red, and orange. In the Huasteca they are the type appearing in the Panuco Phase, while the five sherds found in the Sierra de Tamaulipas occurred in Los Angeles components.

Tancol Brown-on-Buff [229]

Nineteen of these sherds occurred in Los Angeles components. Their paste is like that of Huasteca Black-on-White, but they are surfaced with a brown or buff slip and the decoration is done in dark brown. They indicate that the Panuco Period of the Huasteca and the Los Angeles Phase are contemporaneous.

Panuco Grey [230]

Eight sherds occurred which have grit temper and a coarse paste, extremely well-fired to a grey color. The surfaces are smoothed and well-polished. This seems to be Panuco Grey from the Tampico–Panuco area where it occurs from the El Prisco to the Panuco Period. In the Sierra de Tamaulipas it occurs only in the Los Angeles Phase.

Las Flores Molcajetes, Fine Paste [231]

These four sherds from Tm c 314, Level 1, have a very fine chalky paste with no temper. The surface is well polished and bears incised dots and dashes on the bottom of the interior. These sherds are Las Flores Molcajetes Fine Paste that occurs in the Las Flores and

[224] Ekholm, 1944: 345.
[225] *Ibid.*, 352–355.
[226] *Ibid.*, 411.
[227] *Ibid.*, 364.
[228] *Ibid.*, 409.
[229] *Ibid.*, 410.
[230] *Ibid.*, 346.
[231] *Ibid.*, 343.

Panuco Periods in the Huasteca and indicates that the Los Angeles Phase overlaps with them.

Panuco Heavy Plain [232]

This one sherd is about an inch thick and has large amounts of heavy quartz temper and a paste that is extremely granular. The surfaces are smoothed and brown in color. Though it is difficult to say exactly, this sherd seems to be most like the Heavy Plain type of Panuco that is prevalent in all periods of the sequence. In the Sierra de Tamaulipas it appears in a Los Angeles Phase component.

Aberrant (Nogales) Neck-banded

(Fig. 40, No. 1–3)

Only about eleven sherds of this type were studied.

Paste: Same as Los Angeles Brushed.

Surface finish: The original coils of the pot, which slope downward from the interior, have been poorly welded together. The general process of welding seems to have been mainly on the inside, which is smooth. The exterior coils have been only pushed together at about half-inch intervals. This gives the exteriors a definitely corrugated appearance. One sherd shows brushing below the neck-banding.

Vessel form: Three rim sherds occurred, and each appears to be from an entirely different vessel form. One sherd is the rim of an incurved rim bowl; another is a rim of a small-mouthed outflaring olla; and the final one is the rim of a small-mouthed olla, which has a bulging collar just below the lip on the rim and neck.

Geographical range: Canyon Diablo.

Temporal range: Early Los Angeles.

Relationships: These sherds may be related to San Lorenzo Corrugated in southwest Tamaulipas, but the paste and the method of molding the neck-banding are different. From east Texas and Arkansas, Leesburg Neck-banded and Nash Neck-banded of the Titus and Texarkana Foci are rather more similar in the execution of the neck-banding and paste, but the vessel forms appear rather different.[233] In the upper Rio Grande Valley regions of New Mexico, Cordova Micaceous-ribbed of early Pueblo IV periods [234] and some of the indented corrugated sherds [235] of Pecos are quite similar. Krieger has postulated a connection between the neck-banding of the Southwest and of east Texas during late prehistoric times. However, to connect these Tamaulipas sherds definitely with areas so far apart on the basis of the present meagre evidence would certainly be presumptuous. It is interesting, however, to note the presence of corrugated and brushed utilitarian wares in the very late prehistoric period in these three areas about equidistant apart. This certainly poses a problem worthy of further investigation.

Leland Incised

(Fig. 43, No. 1)

There are two sherds of this type. The first, found in an archaeological survey in 1954 in southern Tamaulipas, seems to be worth commenting upon in some detail, because it is the first actual evidence of an aboriginal southeastern United States sherd being found *in situ* in Mexico.

The sherd itself has very small amounts of fine temper, of which one or two pieces may be very finely-ground shell. Texture is fine and homogeneous, and the interior of the sherd is grey, fading to orange near both surfaces. The surfaces are polished and range from dark brown to orange. The decoration was made with a rounded implement, and the surfaces seem to have been polished after the incising (though the polishing does not appear down inside the incising). It is a relatively small sherd so the total design cannot be determined, but the design seems to be on the body of some sort of water bottle and consists of two parallel lines forming a spiral.

The sherd illustrated was found on the surface of a cave (Tm c 314) in the southern Sierra de Tamaulipas, about five miles east of Rancho Almagre. I found the sherd when I was in the company of Peter Pratt. Later, during excavation of this cave, Peter Pratt found one extremely small sherd, just like it, in Level 2 of Sq. W5. This sherd is associated with artifacts of the Los Angeles Phase.

Now as to the sherd itself. Since the sherd was obviously totally unlike anything we had previously found in Tamaulipas, and since it looked as if it ought to have Caddo affiliations, I sent it to Alex Krieger for identification. The following are his comments:

> The sherd you sent is very interesting indeed. Leaving out your date of 1400–1750 for the present, I have studied it carefully for what it might be. Almost immediately, I decided it was not Caddoan, for reasons I won't detail just now. However, I think it agrees rather well with what Jimmy calls *Leland Incised* in the Phillips, Ford, and Griffin opus "Archaeological Survey in the Lower Mississippi Alluvial Valley," 1951, which I presume you have.[236] See type description on pp. 137–140 and Figs. 91 *e–n* and *i–k*, *m–n*. Altho Jimmy says this type is shell-tempered, he also says that "in some examples it is difficult to see any shell particles"—that is, if they are present, they are minute and may only be part of the clay selected. The polish, color, and grooved lines seem to agree, also the spacing between the lines, presence of one or more horizontal lines above the design (about where the rim zone should start), and the two lines which come in near the right side and form a closed loop. Furthermore, Jimmy states that this type is closely related to Fatherland, Natchez, and Bayogoula Incised. On p. 140 he puts Leland Incised as "tend to cluster around time B," but I see no reason to set it in any different time period from Fatherland, etc.; that is, very late, almost

[232] *Ibid.*, 344.

[233] Krieger, 1946: pl. 34 and 35.

[234] Mera, 1935: pl. X—top row.

[235] Kidder and Shepard, 1936: figs. 254 and 255.

[236] Phillips, Ford and Griffin, 1941.

historic and extending into historic (16th–17th centuries?). See his Figs. 99 *j*, *k*, *n*, for designs that come very close to yours. Possibly *k* comes close in shape although your sherd lacks a rim.

Krieger, in turn, because of his identification, sent it to Griffin, who comments as follows:

I think your [Krieger's] deduction on this particular specimen from Tamaulipas is about as accurate as I can do. I saw the specimen before I read your letter, and Leland Incised and the types revolving around Fatherland and Natchez were exactly what came to my mind. I suspected at first that this piece might be shell tempered but could find no indication of it in the cross-section, even in relatively clean cross-sections. One tiny whitish fragment on the exterior lower third of the surface of the specimen I did manage to have fizz with dilute hydrochloric acid, and for Scotty's benefit I have encircled this particular hole with lead pencil. I am not, however, certain that the specimen is shell tempered.

I made an inspection of our type drawers and of our relatively small collections from the area in Mississippi where this type might reasonably be expected to be found and was unable to come as close to it as I would like to have done. I am, therefore, taking the liberty of sending the specimen to Phil Phillips to see if he is able to come any closer with their more extensive material.

My best guess it that it is pretty close to Leland and that it should date somewhere around 1500.

Griffin, in turn, sent it to Ford and Phillips, his partners in the central Mississippi Valley. Below is quoted part of Griffin's letter, which, in turn, quotes James H. Ford, of the American Museum of Natural History, and Phil Phillips, of the Peabody Museum of Harvard University.

I sent your sherd to Phil Phillips and he said, " It certainly ought to be closely related to the Leland-Fatherland-Natchez continuum but doesn't agree with any sherds that I have here, but I don't have any from sites south of Vicksburg. Both ware and treatment are different from Leland at Lake George, Haines Bluff, etc. You wouldn't have any trouble sorting it. Sorry to be so unhelpful."

I also sent the sherd to Ford. He says, "I think that you are quite right that it belongs to the Leland-Fatherland group, but it seems to be a little too sandy and too hard to have come from the lower valley. Perhaps it was made in the Chicasaw area. At any rate it must date around 1600–1700."

After they had made these identifications I let them know where the sherd is from. I think that you will see that the opinions more or less coincide.

All in all, the sherd seems to be Leland Incised. Ford's charts would date it as about 1600 to 1700, though its beginning date might go back to Ford's Horizon D, somewhere in the thirteenth century. These temporal estimates of Leland Incised agree very closely with the temporal estimates of the Los Angeles Phase, with which the sherd was associated.

On the basis of the above data there seems to be a high degree of probability that at least one aboriginal Mexican culture, the Los Angeles Phase, was in contact with a culture of the southeastern United States or, more specifically, time B, or Mississippian of the lower Mississippi alluvial valley, between 1400 and 1700. How this contact was made still remains a moot question, but it did exist, and this fact should have considerable relevance to the problem of Mexican southeastern aboriginal relationships and the route of these contacts.

9. FIGURINES

Figurine fragments, numbering 170, occurred in the Laguna, Eslabones, and La Salta Phases. The Laguna Period has only hand-modelled figurines. The heads belong to four different types: Panuco Type A, Panuco Bulging-eye, Panuco Type C, and Panuco Coffee Bean-eye, and five fragments were so badly worn that their type could not be determined. The thirteen long conical figurine legs with slightly bent feet are much the same as those of the later periods. Figurine arms characteristically have bracelets and arm bands. Laguna figurine bodies have breasts, and all but two have some sort of necklace. Four also have belts, one with some sort of loin cloth, and four of the necklaces have some sort of attached cape hanging down the backs.

The Eslabones Period sees a radical shift in figurine types. Modelled figurines (five) are rare, only two heads were recognizable as to type, one being a Panuco Type C and the other a badly worn Panuco Type A. More common are mold-made figurines. One of these is a Panuco Portrait type; one is a jaguar head; seven have rectangular headdresses; one has a triangular headdress; and two could not be classified as to type. All of the kinds of arms, legs, and bodies that occurred in the previous phase are present along with some new varieties: a short conical arm without trappings, bodies with flat chests and no clothing, and flat-chested bodies with necklaces and sometimes belts appear.

Though the La Salta Period is more poorly represented, it displays a different figurine complex. All three figurine heads are mold-made; one has a triangular headdress and the other two wear rectangular ones. The one arm is short and pointed, the bodies are flat-chested and without clothing, and the two legs are the same as the earlier ones.

The figurines from the Sierra de Tamaulipas are closely related to the Panuco–Tampico area. The Bulging eye Type, Panuco Type A, the Coffee Bean-eye Type, and Panuco Type C of the Laguna Phase appear at Panuco in late El Prisco (Period II) and in early Pithaya (Period III) times.[237] The Eslabones combination of Panuco Type A, Panuco Type C, Rectangular Mold-made Type and Portrait Type, appears in the late Pithaya (Period III) and early Zaquil (Period IV) times.[238] The mold-made type with a triangular headdress (La Salta Period) occurs at Panuco in the Zaquil (Period IV) and Las Flores (Period V) Phases.[239]

[237] Ekholm, 1944: 458.
[238] *Ibid.*
[239] *Ibid.*

TABLE 13

DISTRIBUTION OF FIGURINES IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components Surface components	Total figurine fragments	Figurine heads										Figurine limbs				Figurine bodies			
			Modelled head fragments (indeterminate as to types)	Panuco Bulging-eye modelled heads	Panuco Type A modelled heads	Panuco Coffee-bean Eye modelled head	Panuco Type C modelled heads	Portrait mold-made head	Mold-made jaguar head	Rectangular head mold-made	Triangular mold-made heads	Crude round mold-made (indeterminate) type heads	Arms with arm bands	Arms with arm bands and bracelets	Arms without ornaments	Leg fragments	Breasted bodies with clothing and ornaments	Breasted bodies without clothing or ornaments	Flat-chested with clothing and ornaments	Flat-chested without clothing or ornaments
La Salta	Tm r 79, level 2	6								2	1	1				1				1
	Tm r 78, house 2	8										6			1	1				
	Total La Salta figurine fragments	14								2	1	7			1	2				1
Eslabones	Tm r 86, surface	19								1			8			3	1	3	3	
	Tm r 6, levels 1–3 and surface	72	3				1	1	1	4	1	2	15	1	1	14	4	9	9	6
	Tm c 81, layer 2	1								1										
	Tm r 86, level 3	4			1					1			1			2				
	Tm c 82, layer 3	3														1		1	1	
	Total Eslabones figurine fragments	99	3		1		1	1	1	7	1	2	24	1	1	20	5	13	13	6
Laguna	Tm r 86, level 4	1			1															
	Tm r 86, level 5	2														1	1			
	Tm r 88, level 2	2	1		1															
	Tm r 223	2					2													
	Tm r 301	1					1													
	Tm r 302	1			1															
	Tm r 324	1		1																
	Tm r 195	2			1		1													
	Tm r 172, levels 1–3 and surface	44	4	3	4	1							2	1		12	15	2		
	Tm c 174, layer 1	1		1																
	Total Laguna figurine fragments	57	5	5	8	1	4						2	1		13	16	2		
	Total Figurine Fragments	170	8	5	8	1	5	1	1	9	2	9	26	2	2	35	21	15	13	7

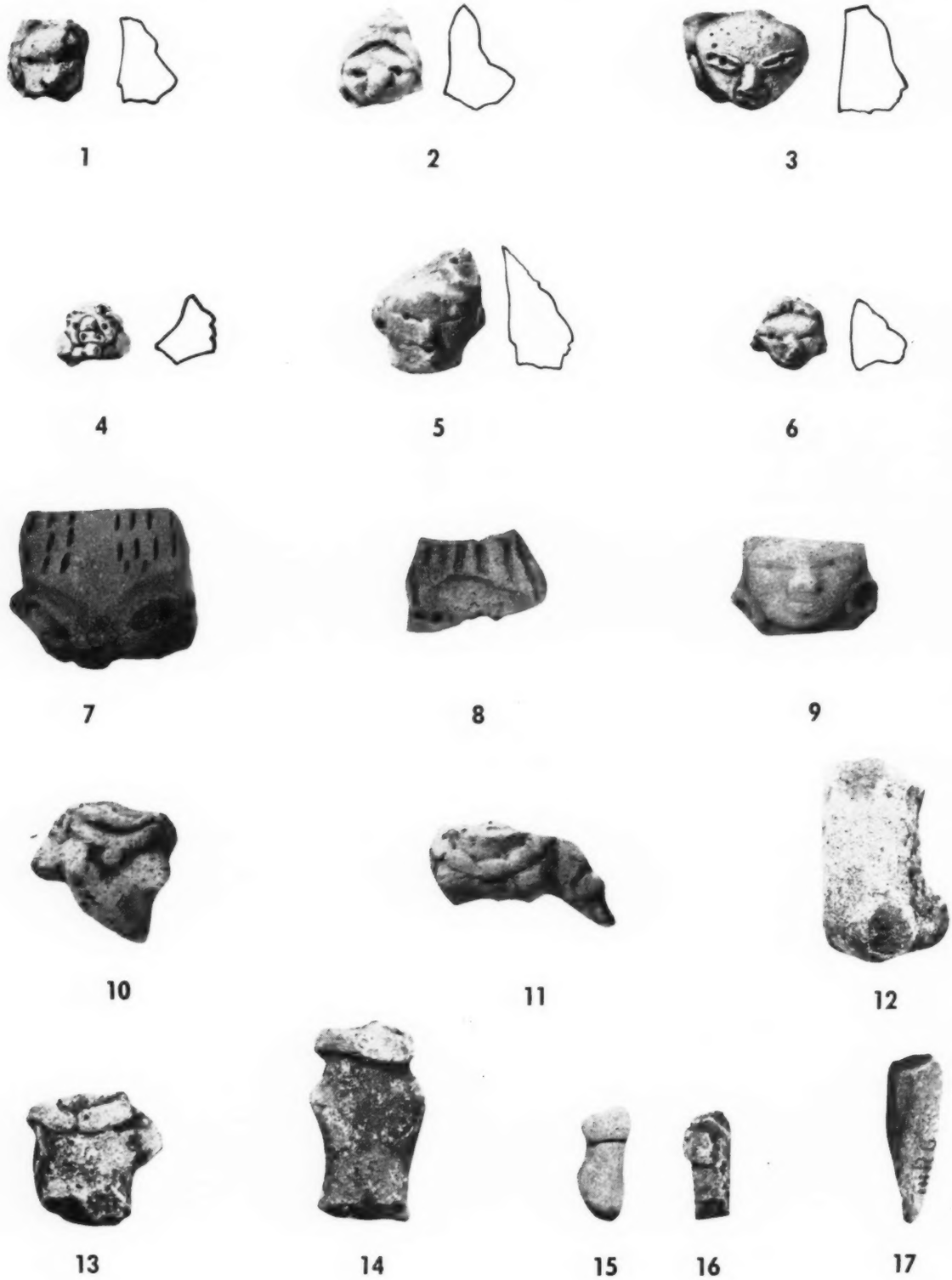


FIG. 41. Figurines (1/2 natural size). 1–2. Panuco Type C. 3. Panuco Coffee-bean Eye type. 4. Aberrant type. 5–7. Panuco Type A. 8–9. Panuco Bulging Eye type. 10–11. Full-breasted bodies. 12. Seated body. 13–14. Flat-chested bodies. 15–16. Arms with arm bands. 17. Pointed foot.

Thus, the sequence of the types of the Sierra de Tamaulipas not only connects the phases of the two areas but reconfirms the sequence of the types.

An examination of the figurines also reveals some details of clothing of the Laguna, Eslabones, and La Salta Periods. Large doughnut-shaped ear-plugs and necklaces occur on all figurines. Two from the Laguna site have nose-plugs. Arm bands, belts, and wristlets are common to the Laguna and La Salta Periods. Furthermore, necklaces have capes hanging down the wearers' backs, and belts have either some sort of loin cloth or diaper attached to the belts in these periods. Headdresses vary with each period. The Laguna Phase has conical turbans and some sort of high fezlike cylindrical hat. One fragment of the Eslabones Phase has some sort of low flat-top cylindrical hat and the others show a piece of cloth wrapped around the head. The La Salta Period has a sort of low flat hat composed of two elements, the one on top being larger; perhaps the headdress is a single scarf wrapped tightly around the head and then more loosely wrapped around itself.

There is a whole series of questions that is inherent in the study of figurines. In the present instance, what was the cultural function of the figurine? Is it a replica of a major god, a god of a cult, a family ancestor, or some sort of household genie? Does the shift from modelled figurines of many diverse forms to mold-made figurines reflect a shift in devotion from a motley collection of local supernaturals to a few well-defined divinities specified by a priestly hierarchy? Does the shift from obviously female figurines to ones not so obviously female, or even male, mean that goddesses were the major figures in the earlier period but later declined in importance, suggesting a lessening of emphasis on fertility? These and many more problems are posed by the figurines, but unfortunately our sample and excavation from the Sierra de Tamaulipas are too meagre to answer them. Perhaps future work will.

Panuco Bulging-eye

(Fig. 41, No. 8–9)

Three broken-off heads of this type occurred at the Laguna site; one was found in Layer 1 of the cave Tm c 174, and one occurred on the surface of Tm r 324. The clay is very fine-grained, and the surface often has a polished surface. In size they vary from 35 to 60 mm. long, 30 to 40 mm. wide, and 20 to 32 mm. thick. The eyes consist of a central perforation in a horizontal groove on a bulge in the face. Lips are indicated by appliqués of clay with two central perforations. All have ear-plugs. One has a conical turban, and the others seem to have some sort of rectangular headdress. Necks indicate that the heads were at nearly right angles to the vertical axis of the missing bodies. The backs of the heads are flat. This is a Panuco type.[240] It is confined to the Laguna Phase in the Sierra de Tamaulipas. At Panuco this type is confined to the El Prisco (II) Period.[241]

Panuco Type A

(Fig. 41, No. 5–7)

Four heads of this type occurred at the Laguna site, two very eroded heads in Levels 3 and 4 of the Eslabones site, and one each on the surface of Tm r 195, Tm r 302, and Tm r 88. All are made of fine-grained clay, which has a chalky feel. In size they range from 30 to 50 mm. long, 25 to 30 mm. wide, and 16 to 27 mm. thick. Characteristically, they have eyes that show a large central perforation, on either side of which are two down-sloping, more or less triangular grooves. This makes each eye look like a small inverted V. They all have large noses, and two have nose-plugs. Lips are indicated by small horizontal appliqués of clay, and mouths by either two punctates or an incision. All have disk-shaped ear-plugs. Three seem to have conical turbans on their heads, while others have some sort of squared or fezlike headdress. The backs of the heads are more or less flat.

In the Sierra de Tamaulipas they occur mainly in the Laguna Phase but carry on into early Eslabones times. At Panuco they occur from the El Prisco (II) to the early part of the Zaquil (IV) Periods.[242] Ekholm has previously noted the resemblance of this type to the Type I of Middle Tres Zapotes of southern Vera Cruz and to Vaillant's Type A of the Late Copilco–Zacatenco Period in the Valley of Mexico.[243]

Panuco Coffee-bean Eye

(Fig. 41, No. 3)

This one head from the surface of the Laguna site has a porous and laminated paste, no temper, and a polished surface. In size it is 24 mm. thick and 51 mm. wide, and with the missing headdress would have been about 55 mm. long. The eye is formed by putting a central perforation in an oblique groove on an oblique appliqué of clay. The mouth is an appliqué of clay with two punctates. The nose is a triangular appliqué, and the large ear-plugs are circular appliqués. The face is roughly triangular and prognathic; the back of head is flat.

This head bears resemblances to the Panuco Coffee-bean Eye type running from late El Prisco (II) to early Panuco (VI) Periods.[244] It differs, however, in paste and size. This head from Laguna is also similar to Type A of the Formative Period in the Valley of Mexico.[245]

[240] Ekholm, 1944: fig. 30, pp. 436–441.

[241] *Ibid.*, table 6, p. 458.

[242] *Ibid.*

[243] *Ibid.*, 445–446.

[244] Ekholm, 1944: fig. 36, *g–o*.

[245] Vaillant, 1930: pl. XXI, top row, no. 5.

Panuco Type C

(Fig. 41, No. 1 and 2)

The five small fragments of small Panuco Type C figurines occurred on the surface of Tm r 6, Tm r 323, Tm r 310, and Tm r 195, and collectors in Ciudad Victoria have a number from Tm r 172, Tm r 194, and Tm r 196. All are about 30 mm. long, 20 to 30 mm. wide, and about 20 mm. thick. They have fine paste and no temper. Eyes are made by three perforations with the central one being a dot and two on either side being elongate, sloping away in opposite directions from the dot. Mouths are horizontal appliqués of clay with lines through them. Noses are triangular appliqués of clay. Two have ear-plugs, and one shows part of a turban headdress. The face itself is roughly oval, and the head prognathic with a flattened back.

Ekholm has assigned this type to the Pithaya (Period III) Phase at Panuco.[246]

Modelled Heads

Besides the identifiable types there were eight small fragments of heads from Tm r 172, Tm r 88, and Tm r 6. These heads had obviously been hand-made but were too fragmented to type, as neither eyes nor headdress were apparent. (I suspect, on the basis of their size, that they are all Panuco Type A.)

Portrait Type

(Fig. 42, No. 9)

This single head from the surface of the Pueblito site is made of fine-grained porous paste with a smooth surface. It is 82 mm. long, 77 mm. wide, and 37 mm. thick. The face is modelled in a very realistic style; the eyes are closed, and the face has a classical Grecian look. It has large back-sloping ear-plugs. The back of the head is flat, and the top is pierced. It has no headdress.

In the Sierra de Tamaulipas this type occurs in the Eslabones Phase, while in the Tampico region it occurs in the Pithaya (III) and Zaquil (IV) Periods.[247] This type appears in the Valley of Mexico in Teotihuacan Period III.[248]

Rectangular Head Mold-made

(Fig. 42, Nos. 4–7)

Four of these heads occurred on the surface of Tm r 6, and one on Tm r 85. One was found in excavation of Tm r 86, Level 3, and one in Layer 2 of Tm c 81. All are of the Eslabones Phase. The specimens all have a fine-grained porous paste and a smooth surface. Three of these from Pueblito (Tm r 6) look almost as though they came from the same mold. They are 47 mm. wide and long, and 18 mm. thick. The other from Pueblito is 51 mm. long, 47 mm. wide, and 18 mm. thick; the one from Tm c 81 is 42 mm. long, 34 mm. wide, and 15 mm. thick. Each has poorly defined facial features, a rectangular headdress or background for the head, and ear-plugs.

These heads have a general resemblance to ones of the Zaquil (IV) and Las Flores (V) Periods at Panuco[249] but they are specifically like one from Teotihuacan IV in the Valley of Mexico.[250]

Triangular Mold-made Head

(Fig. 42, No. 1)

One large piece of a figurine of this type occurred in Level 1 of the La Salta excavation, and one small fragment came from the surface of Pueblito, Tm r 6. Both have fine-grained porous paste. The large fragment is 39 mm. long, 52 mm. wide, and 14 mm. thick. The features are rather poorly defined, but the eyes have later been incised. The ear-plugs are round and stand out from the head, and the relatively triangular face extends into an expanding headdress with a flat top. The back of the head is flat.

This Eslabones and La Salta Phase type is extremely similar to one from the Panuco site, Level 5, Las Flores (V) Period, and has a general resemblance to others from Zaquil IV and Las Flores (V) Periods at Panuco.[251]

Mold-made Jaguar Head

(Fig. 42, No. 10)

This small head from the surface at Pueblito has a fine-grained, well-consolidated paste. It is about 40 mm. long and wide, and 47 mm. thick. It is mold-made and has a flat back.

It is a good likeness of a head of a jaguar with its eyes closed, mouth partially opened, and upper fangs and tongue showing.

This is unique to the Eslabones Phase of the Sierra de Tamaulipas.

Crude Round Mold-made Heads

(Fig. 42, No. 2, 3)

These two fragments of heads from Pueblito (Tm r 6), a component of the Eslabones Phase, and one from

[246] Ekholm, 1944: 444, 445.
[247] Ekholm, 1944: fig. 37.
[248] Vaillant, 1938: 542, fig. *i, j.*
[249] Ekholm, 1944: fig. 38 *t.*
[250] Armillas, personal communication.
[251] Ekholm, 1944: fig. 38 *f.*

FIG. 42. Eslabones and La Salta Phase figurine heads (1/2 natural size). 1. Triangular head mold-made (from Tm r 79). 2–3. Crude round mold-made heads (from Tm r 6). 4–7. Rectangular heads mold-made (from Tm r 6). 8. Effigy bowl (from Tm r 6). 9. Portrait Type head (from Tm r 6). 10. Mold-made Jaguar head (from Tm r 6).

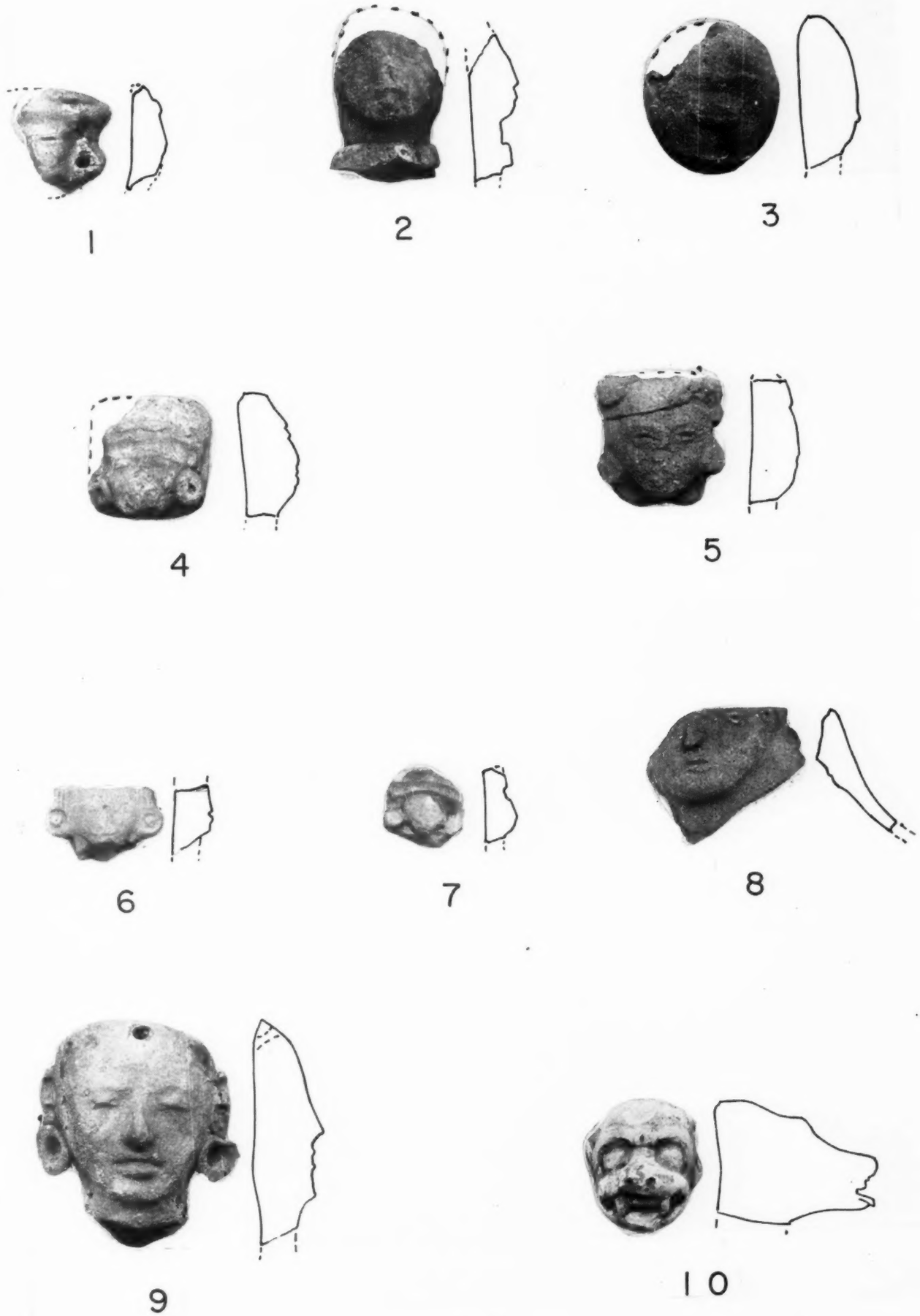


FIG. 42.

Level 1, Tm r 79, have a poorly knit porous paste. They are disk-shaped, about 50 mm. in diameter, and 20 mm. thick. Backs of the heads are flat, and facial features are barely distinguishable. They have no headdress or ear ornaments.

Figurine Bodies

(Fig. 41)

The fifty-six bodies are characteristically broad-shouldered and wasp-waisted, about 70 mm. long, 30 mm. wide, and 20 mm. thick. Thirty-four show well-formed breasts; two from Pueblito show poorly defined breasts, and fifteen from Tm r 6, three from Tm r 86, and one from Tm r 79 are flat-chested. Sixteen have necklaces around their necks; seven have belts or the top of a garment around their waists; two small fragments seem to have loin cloths or diapers, and six appear to have capes held by necklaces. Navels appear on thirty-seven specimens.

Figurine Legs

(Fig. 41)

Figurine legs are characteristically bulbous at the hips. Fourteen have slight raised portions to represent knees; the others do not. Feet are usually pointed and bent slightly forward from the rest of the leg. Pubic sections show most figurines to have been women. One leg fragment is folded. They are about 40 mm. long.

Figurine Arms

(Fig. 41)

With two exceptions, the arms are short conical fragments and slope outward from the body. Twenty-six of them have an appliqué of clay on the exterior of the arm near the shoulder, which I believe is meant to be an arm band. Two arms are longer than the others and are slightly bent at the elbow; they have appliqués to represent both bracelets and arm bands.

10. OTHER CLAY OBJECTS

Besides the figurines and potsherds, fifty-two other clay artifacts were found. Most of these came from Laguna, Eslabones, and La Salta horizons, but two unique items occurred with Los Angeles. Clay rattles and flutes were found in Laguna and Eslabones components. Ladles, effigy cups, unperforated clay dishes, and perforated clay dishes came from Laguna, Eslabones, and La Salta Phases. The Los Angeles components produced a single plain clay spindle whorl (probably from the Huasteca) and a clay pipe stem. As in so many other classes of objects, Los Angeles reveals a lesser number than the three previous horizons.

Ladle Fragments

(Fig. 43, No. 4)

Nineteen ladle fragments occurred: twelve from the Laguna Phase, six from Eslabones, and one from La Salta. Handles, except for two rectangular ones from Tm r 6, are cylindrical and taper to a point. They range from 72 mm. to 168 mm. in length, and maximum diameter near the bowls is from 19 to 47 mm. No whole bowls were uncovered, but all seem to be a continuation of the handle and are roughly 50 mm. deep and 80 mm. in diameter.

Rattle

(Fig. 43, No. 3)

Part of a clay rattle, a short solid stem, which was evidently attached to a bulbous hollow body, was discovered at Tm r 6, and part of a body occurred in Level 2 of Tm r 172. The stem is about 20 mm. long, and the body is about 50 mm. in diameter. These are common in most of Mexico.

Clay Flutes

(Fig. 43, No. 5)

One part of a flute occurred at Pueblito and another smaller fragment at Laguna. Both are about 13 mm.

TABLE 14

DISTRIBUTION OF OTHER CLAY OBJECTS IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components Surface components	Totals	Ladle	Rattle	Effigy cup	Flute	Bead	Unperforated disk	Perforated disk	Spindle whorl	Pipe stem
Los Angeles	Tm c 314, layer 1 Tm c 81, layer 1	1 1								1	1
La Salta	Tm r 79, level 1 Tm r 78, house 2 Tm c 314, layer 2	1 4 1	1		1			2	2		
Eslabones	Tm r 6	18	6	1	2	1	1	6	1		
Laguna	Tm r 301 Tm r 324 Tm r 172, levels 1–3	1 4 21	1 11	1	1 1	1	3	1 3	1 2		
	Total Clay Objects	52	19	2	5	2	4	12	6	1	1

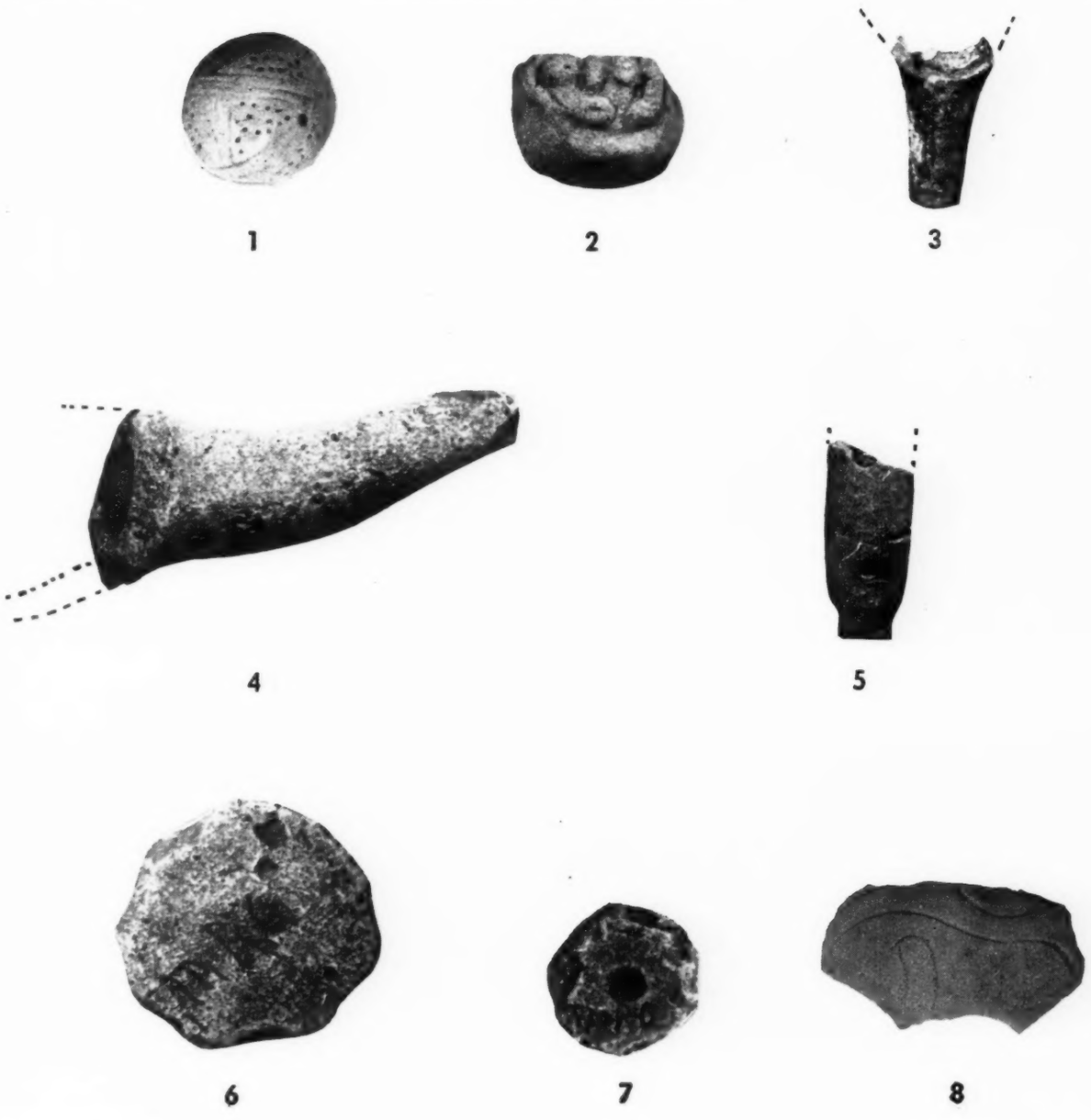


FIG. 43. Clay objects (1/2 natural size). 1. Clay ball. 2. Effigy cup. 3. Rattle. 4. Ladle fragment. 5. Flute. 6. Clay disk. 7. Perforated clay disk. 8. Leland Incised aberrant sherd.

in diameter, cylindrical with a contracting mouth, and have small holes about 3 mm. in diameter in them.

They are common in most of Mexico, and an almost identical kind occurs in the Panuco area.

Effigy Cups

(Fig. 43, No. 2)

Five fragments of effigy cups occurred in the three phases with ruins. They are all roughly hemispherical with a more or less flat bottom. They range from 42 to 77 mm. in diameter, and all are about 40 mm. deep. On one side of the cup there seems to be a human face made by appliqué and incision. The eyes are ovoid appliqué with or without a horizontal punctation on them. Noses are triangular appliqués, and mouths are horizontal incisions or elongated appliqués, with an incision. Some also have spherical appliqués for ears.

Clay Disks

(Fig. 43, No. 6)

Clay disks appear in components of the Laguna, Eslabones, and La Salta Phases. All are made from potsherds, and their edges have been chipped round. In diameter they range from 20 to 68 mm. They are common objects in Meso-America.

Perforated Clay Disks

(Fig. 43, No. 7)

Five perforated clay disks appeared in Laguna and La Salta, and Eslabones had one. They range from 20 to 58 mm. in diameter. They are also made from potsherds; their edges are chipped and often show evidence of wear, and they have a central perforation about 4 mm. in diameter. These I believe were used as spindle whorls. They are common in most of Mexico.

Spindle Whorls

One fragment of a spindle whorl appeared in Level 1 of Tm c 81, a Los Angeles component. It has a compact paste and little or no temper. It is plano-convex in cross-section and 44 mm. in diameter. It has a hole 4 mm. in diameter through its centre.

I suspect that this has been traded into the area from the Huasteca during the Panuco Period.

Pipe Stem

(Fig. 33, No. 44)

This end of a pipe stem was found in a Los Angeles component (Tm c 314, Layer 1). It is complete at the bit, while the other end is broken. It is 22 mm. long and has a maximum diameter of 12 mm. and a longitudinal hole through it 2 mm. in diameter. Its paste is like that of Los Angeles Brushed, so I suspect it was locally made.

Clay pipes appear in the Huasteca in the Panuco and Las Flores Periods,[252] in the rest of Mexico at the same time period,[253] in southwest Tamaulipas slightly earlier,[254] and considerably earlier in the eastern United States.[255]

11. ARCHITECTURAL FEATURES

Two factors seriously hampered our study of the architectural features of the Sierra de Tamaulipas. First of all, most of the ruins were thickly overgrown with brush, making it difficult to see the structures. Secondly, after the first season my archaeological permit was so worded that I could not dig in ruins. However, in spite of these difficulties we did make a superficial study of them.

Evidence of wattle-and-daub walled houses came from twenty-one sites from Almagre to Los Angeles times. Truncated cones with steps leading up one side (and probably with temples on their summits) occurred in the Laguna and Eslabones Phases, while truncated pyramids with steps were built from Laguna to La Salta times. Circular boulder house-platforms without steps were confined to the Laguna Phase, while circular masonry house-platforms occurred from Laguna through La Salta times. *Tanques*, terraced areas, and paved areas occurred during the same time periods. A ball court was identified at one Eslabones site, a *caracol*-like structure at one Laguna site, and evidence of circular post structure was found at a Los Angeles component.

In summary, then, Almagre, with its wattle-daub as evidence, sees the beginning of relatively permanent structures. Laguna sees the apogee of architecture both in number and variety of structures. This continues into the Eslabones Period; circular boulder house-platforms disappear, but a ball court occurs. La Salta sees many of the older architectural features disappearing, even though a new form, the *caracol*-like structure is present. Los Angeles shows little evidence of building other than that of wattle-and-daub houses.

Further investigation should be undertaken, for I feel that the general artifactual differences between the final four phases of the Sierra de Tamaulipas are further emphasized by changes in architecture.

Truncated Cones

Truncated cones were observed at ten sites of the Eslabones and Laguna Phases. All seem to have been made with horizontal slabs of rock as a nucleus. Although steps were not always apparent, many were seen, and I suspect all had them. A number of truncated cones from Tm r 304 were well preserved, and the surfaces had plaster over the horizontal slab-rock interiors. Their steps were not covered with plaster. Their top surfaces revealed that wattle-and-daub houses once capped them. There was some evidence also that the plaster had been painted red. Perhaps all the others at one time had these features. Rough estimates reveal that they are from 10 to 30 feet high and from 25 to 100 feet in diameter. The larger one seems to be the Eslabones Period.

These truncated cones are similar to ones in the Huasteca from El Prisco (II) to Panuco (VI) times. Although round structures appear occasionally in the rest of Mexico, Ekholm has observed that they are both earlier and more common in northeastern Meso-America.[256]

[252] Ekholm, 1944.
[253] Porter, 1948.
[254] MacNeish, n.d.
[255] Griffin *et al.*, 1954

[256] Ekholm, 1944: 499–502.

A

B

C

FIG. 44. House-platforms. A. Boulder house-platform (from Tm r 172). B. Masonry house-platform with steps (from Tm r 6). C. House-platforms forming terraces (from Tm r 79).

TABLE 15

DISTRIBUTION OF ARCHITECTURAL FEATURES IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components Surface components	Terraced areas	Wattle-and-daub from houses	Truncated cones	Truncated pyramids	Circular boulder house-platforms	Tanques	Indeterminate house-platform	Circular slab-masonry house-platforms	Paved areas	Ball court	*Caracol*-like structure	Post-molds only
Los Angeles	Tm c 294		x										
	Tm c 221		x										
	Tm c 198		x										
	Tm c 83		x										x
La Salta	Tm r 323	x			x			x	x				
	Tm r 79	x	x		x			x	x	x			
	Tm r 80	x							x				
	Tm r 78		x		x		x	x	x			x	
Eslabones	Tm r 311a				x		x	x					
	Tm r 304	x	x	x	x		x	x	x		x		
	Tm r 6	x	x	x	x		x	x	x	x			
	Tm r 86	x	x	x	x		x	x	x	x			
Laguna	Tm r 188					x		x					
	Tm r 186		x					x					
	Tm r 185					x		x					
	Tm r 187	x	x	x	x	x	x	x	x	x			
	Tm r 262		x	x				x					
	Tm r 310	x		x	x			x	x	x			
	Tm r 301		x			x							
	Tm r 324	x	x	x	x	x		x	x	x			
	Tm r 88	x			x	x		x					
	Tm r 302		x	x	?	x		x	x				
	Tm r 223		x	x	x			x					
	Tm r 196		x					x					
	Tm r 195		x					x					
	Tm r 194		x		x	x		x					
	Tm r 172		x	x	x	x	x	x					
Almagre	Tm c 139		x										

Truncated Pyramids

Truncated pyramids occurred at fourteen sites of the Laguna, Eslabones, and La Salta Phases. They seem to be more common in La Salta times. All are made from horizontal slabs of rock. They appear to have sloping sides (not stepped), and steps appear on their shorter sides. Most are roughly rectangular in outline, and from 15 to 400 feet long, 10 to 150 feet wide, and 5 to 40 feet high. At Tm c 78 the steps were flanked by pilasters. Wattle and daub on the summit of some at Tm c 324 indicate that temples were probably on their flat summits.

Similar ones occur over much of Mexico.

Circular Boulder House-platforms

(Fig. 44, A)

All the house-platforms at the Laguna ruin (Tm r 172) and the Cerro Refugio ruin (Tm r 88) were circular boulder types. A few occurred at other Laguna sites. (I was told of one from Pueblito (Tm r 6), but I never could find it.) Thus they are good Laguna Phase characteristics.

They are from 8 to 24 feet in diameter, and their circular sides are outlined by boulders from 6 inches to 2 feet in diameter. Inside the boulder outline, rocks and dirt were piled up to the level of the top of the boulders. On this level are to be found patches of burned floor, artifacts, and pieces of wattle-and-daub. Excavation of one at Tm r 172 reveals that they were house-platforms.

Roberto Pavon informs me that such occur in the Huasteca, but I know of no similar one from other regions of Mexico.

Circular Slab-masonry House-platforms

(Fig. 44, B)

These occurred at eleven sites of the Laguna, Eslabones, and La Salta Phases. They seem to be rare in early Laguna times. The house-platforms are circular in shape (10 to 20 feet in diameter), and the sides are composed of vertical walls of stone slab masonry. The walls are from 1 foot to 6 feet in height. The tops of these structures are flat and often are covered by a burned clay floor, occupational debris, and occasional pieces of wattle-and-daub. Below these top surfaces are large rocks, dirt and refuse, apparently used as fill. Tangent slab steps lead from the ground to the platform. These steps are associated mainly with late ceramic remains at Tm r 78 and Tm r 79. However, some occurred at early sites.

Roberto Pavon informs me that such structures are fairly common in the Huasteca and run from the El Prisco (II) Period to the Panuco (VI) Period. Du

Solier also excavated in one of them in the Huasteca at Buena Vista near Huaxcama.[257]

They were undoubtedly the platforms for (circular?) wattle-and-daub houses.

Tanques

These hollow depressions, which hold water during much of the year, were found at seven sites of the Laguna, Eslabones, and La Salta horizons. They range in size from 15 to 40 feet in diameter and from 2 to 15 feet deep. Many of these may be natural features, but at least one in the east end of Tm r 6 has a masonry retaining wall; all of them could possibly be of artificial construction. Artificial or not, they are common features of the ruins and undoubtedly were a source of water.

Paved Areas

Areas paved with flat slabs of rock occur at Laguna and Eslabones sites. The areas paved are usually roughly rectangular, from 10 to 14 feet long and from 7 to 11 feet wide. They may have been flooring for some sort of wooden structures.

Terraces

(Fig. 44, C)

Terraces with slab rock retaining walls from 6 inches to 6 feet high are common at sites of the Laguna, Eslabones, and La Salta Phases. The areas covered by the terraces average from 10 to 200 feet long and 3 to 30 feet wide. Often they connect house-platforms built at the same elevations along the flanks of hills. At Tm r 187, most of them had steps through them. I suspect these were built for landscaping rather than for agriculture.

Ball Court

One ball court occurs at Tm r 304, an Eslabones site. The court was an oval area about 120 feet long and 75 feet wide, which had been levelled off and outlined by stone (and perhaps paved with stone). Along the side of the court were two parallel rectangular structures about 10 feet high, 80 feet long, and 20 feet wide. Though they were in a bad state of decay, the side facing the court seems to slope up gradually while the opposite was steep. (One of the local ranchers, not a reliable informant, said he had picked up a stone ring at the court when he was a boy.) In the east end of the court was a small round (12 feet in diameter) temple or altar.

Ball courts occurred in southwest Tamaulipas and in the Huasteca at a slightly later date. Farther south they were fairly common after the Formative Period.

[257] Du Solier, Griffin, and Krieger, 1947: fig. 2.

Caracol-like Structure

This one, made of slabs of rocks, occurred at Tm r 78. The body is identical with the house-platforms, being about 8 feet high, 20 feet in diameter, and with steep masonry walls. However, the difference lies in the staircases. Series of steps are found on opposite sides of the platform. These are curving staircases that rise parallel to the sides of the structure (each executing a half spiral), and the bases of the staircases face in opposite directions.

Pollock has indicated that round structures, particularly *caracol* towers,[258] in most of Mexico are associated with late horizons (Tula-Mazapan and Aztec) and seem to be connected with the worship of the god, Quetzalcoatl. However, as Ekholm has pointed out, it is not unlikely that circular structures are somewhat earlier in the Huasteca.[259] Perhaps they also are somewhat earlier in the Sierra de Tamaulipas, which has so many features in common with the Huasteca.

Post-molds

Five post-molds, each about 5 inches in diameter, occurred at Tm c 83. They were between 10 and 14 inches apart and curved about 1 foot in a distance of 5 feet. Their association with wattle-and-daub and Los Angeles artifacts leads to the conclusion that the Los Angeles peoples lived in circular or ovoid houses with a pole framework and wattle-and-daub walls.

Similar houses are common over a long time period in the Huasteca[260] and are used by the present inhabitants of the Sierra de Tamaulipas.

12. BURIALS

Burials were not numerous in our excavations. One flexed burial was found in the La Perra and Los Angeles horizons and two in Almagre components. All were flexed in pits in refuse of caves and had a limited amount of burial furniture. These contrast markedly with those found in a Laguna cemetery, where the burials were bundled in and around a multitude of pots.

This would seem to indicate that burial rites were limited, that special burial places were unnecessary, and that the need of tools to accompany the dead was not too important in La Perra, Almagre, and Los Angeles times. However, in Laguna times (and perhaps Eslabones and La Salta) the dead received more elaborate treatment. First of all, the bodies of the dead were left until the flesh was removed; secondly, the bones of a number of individuals were collected, placed in pits or with pots, and then the whole group was buried in a specially prepared place. It would seem likely that each of these activities was accompanied by rites.

[258] Pollock, 1936.

[259] Ekholm, 1944: 502.

[260] MacNeish, 1954.

TABLE 16

DISTRIBUTION OF BURIAL TYPES IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components	Flexed burials in pits with limited grave goods	Bundle burials in cemeteries with abundant grave goods
Los Angeles	Tm c 82, layer 1	1	
Laguna	Tm c 187		1
Almagre	Tm c 82, layer 4 Tm c 314, layer 7	1 1	
La Perra	Tm c 174, layer 2	1	

Flexed Burials

Four flexed burials occurred. One was a child in a pit in Layer 1 of Tm c 82, a Los Angeles component. In the region of the neck and chest, probably the remains of a necklace placed with the infant, was a set of shell and bone disk beads. The two male adult flexed burials from Almagre components were in pits in Level 4 of Tm c 82 and Level 7 of Tm c 315. The one in Tm c 315 was without grave goods, but that in Tm c 82 had a chipped disk, an ovoid blade, and a Tortugas Triangular point below the feet. The La Perra child burial was in a pit in Layer 2 of Tm c 174. It was wrapped in a net (blanket). In the region of the head were three corncobs wrapped in string.

Bundle Burials

A cemetery was under a plaza about one hundred yards square just south of the ranch house at Tm c 187. In this plaza, we sank three five-foot-square test trenches, fifty yards apart. At a depth of about two feet, burials with accompanying pots were encountered. I suspect the whole plaza is underlain by burials. Only one test square was cleaned out. In the southeast corner of this square was a carinated bowl with a child's limb bones overlain by its body bones, its skull on top with an upside-down carinated bowl above all. In the northwest part of the square there were two adult skulls inside a large bowl. In the centre of the square were three large flaring ollas right-side-up, and one upside-down. One of these right-side-up ones had a series of adult leg bones in it, and another of the right-side-up ones had a humerus and parts of hands or feet. In the east side of the square, a pavement of pottery (representing four or five carinated bowls and one or two ollas) overlay about thirty crushed arm, leg, hand, and foot bones and a skull. There were no body bones in this area. One of the femora had some copper or green stain on it.

As the lack of time, money, and skilled workmen prevented us from excavating the whole area, we filled in the pits.

Similar bundle burials inside of pots have been found in southwest Tamaulipas with the San Lorenzo culture.

13. PICTOGRAPHS

Pictographs were recorded in nine cave sites. They were noted as occurring at fourteen other places without cultural associations. I have classified the pictographs into five general types but as yet have not been able to determine a definite sequence. However, it is my impression that the tally-work type may be as early as Nogales times, and it seems to me that the stick animals and men are of the Los Angeles Complex. However, this cannot be proved at present.

Concentric Circles

Four separate concentric circles occurred on the walls of Tm c 82, and one appeared in Tm c 81. Two in red have two concentric circles, one inside the other, with the larger circle being about 250 mm. in diameter. One in back, about one foot in diameter, has three concentric circles. One small circle in black occurred in Tm c 82, and the one circle at Tm c 81 was similar to it.

Since both caves Tm c 81 and Tm c 82 had a number of different cultural occupations, it is impossible to ascertain who made these circles.

Red Hands

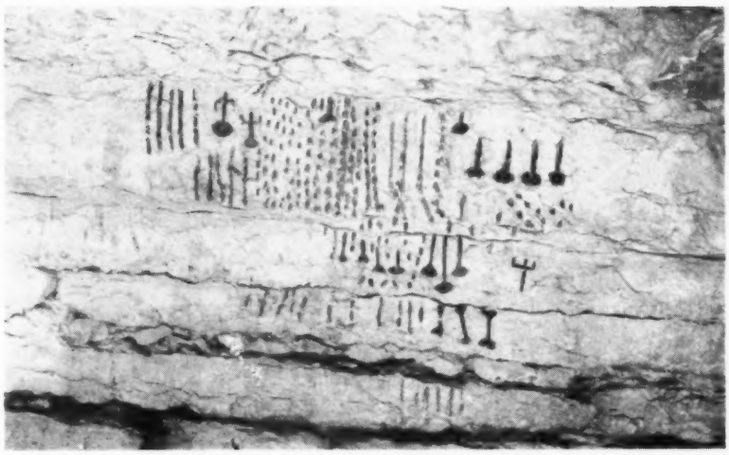
At least eight occurred in Tm c 82, and some appeared in Tm c 84 as well as Tm c 311 and in another cave, unnumbered, in Eslabones Canyon. All hands are roughly natural size and are painted red. It is at present impossible to determine who made them.

Tally Marks

(Fig. 45, 1)

They occurred in Tm c 84, Tm c 175, Tm c 176, Tm c 292, Tm c 311, Tm c 85, Tm c 81, and Tm c 82, as well as in other caves. Basically they are a series of vertical lines about 125 mm. long and 12 mm. wide, side by side. However, in each of these previously mentioned caves, some sets of vertical lines have a diagonal line across them. In Tm c 82 some of the tally marks have horizontal lines above and below them. In both Tm c 85 and Tm c 82, some of the vertical lines are made of a series of dots. All the above varieties are in black. Some of the plain vertical lines in Tm c 85 are in red. In both Tm c 85 and Tm c 82 a few of the vertical lines in either red or black have bulbous masses, about 25 mm. in diameter, attached to their tops. In Tm c 84 a few of the bulbous-ended type in black have U's or inverted U's crossing the lower parts of the vertical lines. In Tm c 85, Tm c 82, Tm c 175, and Tm c 176, vertical lines in black and red have inverted U's across their lower portions.

At present it is not possible to determine who made these marks. It is quite possible that this type may really be a series of types, each with different cultural affiliations.



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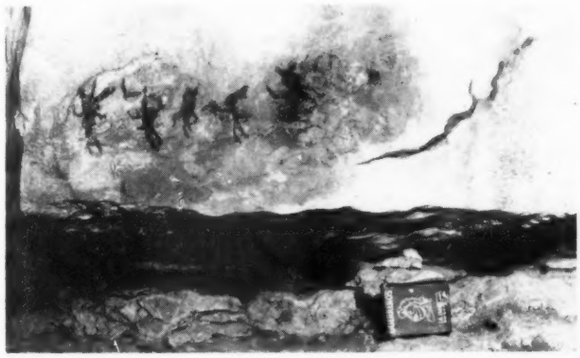

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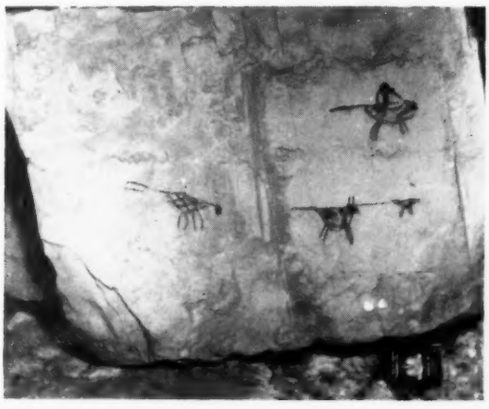


4

FIG. 45. Pictographs (about 1/5 natural size). 1. Tally marks in Tm c 84. 2. Stick men in Tm c 85. Note headdresses and bow in hand of the fourth figure from the left. 3. Scorpion at upper left, and bird and three-legged animal at lower right, from Tm c 85. 4. Upper right, man on horseback, while below it are three horses (or cows), the right-hand two being tied together.

Stick Men

(Fig. 45, 2)

The ones here described are those from cave Tm c 85, but they also occurred in Tm c 82 and Tm c 311, and in one cave at the foot of Cerro Eslabones at the level of Olivo Canyon. (My field notes are very inexact concerning those in the latter two places.)

This kind of figure appears to depict erect human beings in profile. All are done in black. Their legs are usually two short almost parallel lines, either vertical or slanting slightly back from the axis of the body. Bodies are usually rectangular or vertical marks. Arms are lines usually bent at the elbows. They appear in a variety of positions. Both arms may be extended in front of the body either straight or flexed, or one arm may be in front of the body and the other behind, flexed or straight. Heads are indicated by a square or round mass above the body, and are unusually large in proportion to the other body features.

On the back wall of cave Tm c 85 one set of these figures, about 4 feet above the floor, is most instructive. Here there is a procession of five figures about 60 mm. tall (fig. 45, no. 2). The bodies and limbs are the same as described above, but they have a number of added features. All but one appear to have some sort of headdress, indicated by one, two, or three straight lines radiating from the top of the head. It has been suggested that these are feathers, but two of the figures have two lines coming up from each side of the head suggesting some sort of horns. Another interesting feature is that the fourth and fifth figures of this group have something in their hands. Whatever it is in the hands of figure five is indistinguishable, but figure four appears to be carrying a bow.

There is little doubt that these are Los Angeles pictographs, for the only artifacts in Tm c 85 were those of the Los Angeles Phase; also, the cave in Olivo waterhole is so close to the present arroyo bed that it can be of no great antiquity. Furthermore, the historic features of the Los Angeles Phase, such as horse bones, glazed pottery, and the like, tie in temporally with those pictographs in this cave which depict men on horseback (described immediately below).

Animal Figures

(Fig. 45, 3 and 4)

On the walls of Tm c 85 and Tm c 82 were figures of animals. The ones here described are from Tm c 85.

These figures are in both red and black. Some of them seem to be human beings mounted on horses. The animal has a straight back and tail, represented by a single horizontal line. The belly is a single curved arc from one end of the back to the other. Thus the bodies are half-moon in shape. The bodies may be filled by cross-hatching, or they may be blank. Legs on two of the figures are represented by pairs of straight lines extending down from the front and back of the body. One figure has only three lines extending down from the belly. Heads are represented by single thick oblique lines at one tip of the half-moon bodies. Above the backs of the animals are rectangular masses (bodies) topped by round masses (heads) with two oblique lines extending down from the junction of the two (arms). From one of the arms to the animal's head is a single line, possibly representing a rein. A third and fourth set of figures are animals like those above without riders on their backs, but connected by a single line (a rope?). One of these has two horns (?) extending from its head. These sets are usually done in red. Another set in red shows three animals, one on top of the other.

There are a few other drawings in Tm c 85 which include a variety of motifs. Wavy lines or zigzag lines are fairly common. Also zigzag lines with a single line under them occur. Rectangles are also common. One possible bird and turtle (as seen from above) and a crude top view of a scorpion also appear.

All these animal figures are considered to be products of the Los Angeles (Pasitas) peoples for the reasons first given in the "stick men" section.

14. SETTLEMENT PATTERNS [261]

This study is based on 106 occupations representing eight different phases.[262] Not all phases are adequately represented nor were we able to clear enough brush to map or excavate as many of the open sites as I should have liked. In spite of this, however, various kinds of settlement patterns could be determined.

Lerma occupations were all by small groups of people for very short periods of time in caves or at open sites. A few smaller sites, in caves and in the open, of Nogales and La Perra peoples probably also represent very temporary camps, but most of the sites of these two phases reveal peoples occupying caves and camps for longer periods or seasonally. Most Almagre commu-

[261] This section, which was rewritten a number of times at different dates, owes much to a number of people and authors who have influenced my thinking on the matter. For this reason it is impossible to footnote each part exactly. Discussions with Gordon R. Willey, as well as his volume on *Prehistoric Settlement Patterns in the Viru Valley*, of 1953, and the later symposium he organized on "Prehistoric settlement patterns in the New World," 1956, certainly were initial stimuli. The article entitled "Functional and evolutionary implications of community patterning" resulting from discussion of R. K. Beardsley, P. Holder, A. D. Krieger, J. B. Rinaldo, and P. Kutsche, which was edited by R. Wauchope in 1955, also greatly influenced my thinking. Various parts of this section owe much to other authors. The section on band communities is in part derived from Honnigman, 1946, Steward, 1938, and J. H. MacNeish, 1956, while the part concerned with villages was certainly influenced by the writing of Redfield and Villa, 1934, Redfield, 1941, V. G. Childe, 1956, G. R. Willey, 1955, and R. Wauchope, 1952.

[262] Nine of these are Nogales camps from Northern Tamaulipas.

nities are similar. However, two large open sites, one of which has wattle-and-daub on it, suggest relatively permanent houses, indicating that some of the larger bands were living in semi-permanent villages. The Laguna Phase sees a major shift in settlement pattern. We found a single temporary cave occupation by a small group and a single seasonal cave occupation by a slightly larger group, but the other seventeen were permanent occupations. One was a small valley village, two were small hilltop sites with house-platforms and one or two temples, but five were large river-bottom villages with a central plaza surrounded by temple mounds, and nine were large hilltop villages around plaza areas encompassed by temple mounds.

The Eslabones Period is similar, but there are no large valley-bottom villages with plaza. Four especially large villages have plazas surrounded by temples on the tops of very high hills. This is the period of maximum population concentration. The La Salta Phase sees a further change. One temporary cave occupation, one valley village without temples, one seasonal cave occupation, and one large hilltop ruin with a plaza were found, but the four hilltop villages without plazas and with or without temples seem to represent the dominant form of settlement. The population concentration seems to have diminished gradually from that of the Eslabones and the Laguna Phases. The Los Angeles Phase sees a further decentralization of population, as sixteen seasonal cave occupations and eight river-bottom villages without plazas or temples were identified. At this period there were also a few seasonal open occupations, and temporary cave- and open camp-sites. Thus, in terms of population concentration, there is a very gradual increase from Lerma through Almagre times, then a large increase in Laguna times that reaches its maximum in Eslabones times. The succeeding La Salta Phase shows some decentralization which becomes more pronounced in the Los Angeles Phase.

Now the question arises as to the implications of the sequence of the types of settlements.[263] The Lerma occupations reveal a community pattern that might be characterized as *Nomadic Micro-bands*. Tentative reconstruction of such a type would see the Lerma occupations as composed of one or two nuclear families. The subsistence of these families would have been based on hunting with a relatively limited amount of plant-collecting. (In the succeeding chapter, our analysis of food remains supports this inference.) Such activities would force the group to be nomadic or to wander in a restricted area seeking game and only occasionally stopping to harvest or collect certain ripe wild foods.

The Nogales and La Perra occupations reveal a somewhat different community pattern which might be called *Seasonal Macro-bands*. The study of floral and faunal remains indicates that these peoples had a subsistence based mainly on plant collecting, supplemented by a little hunting and a slight amount of limited incipient agriculture (which increases during the course of the two periods). The more characteristic grouping during these times was apparently a group of from about four to ten related families (composing a macro-band) which came together during harvest of wild food plants and agricultural plants. Of course, during the seasons when extensive food gathering was not feasible, these people would break up into micro-bands to wander after game.

Almagre seems to usher in a new kind of community pattern, which I am calling *Semi-sedentary Macro-bands*. It would seem probable that the increasing amount of agriculture and the adoption of new agricultural plants from their neighbors by these basically plant-collecting people caused them to confine their movements to a fairly well-defined area. Not only would the macro-bands have gathered together while plant-harvesting but they would probably have stayed near their cornfields to plant, harvest, and consume their crops. The evidence from Tm c 305 and Tm c 339 indicates that some of their stays were long enough to justify the building of some sort of wattle-and-daub houses. However, during periods when the crop foods were depleted and ripe wild plants were not readily available, the macro-bands may have broken up into nomadic micro-bands. It seems likely that the greater agricultural productivity of this period would have favored population increase and would have allowed the macro-groups to increase in size. If groups of this type had a tendency to become larger and larger, hunting and collecting by the consequently greater number of micro-bands would have become less and less fruitful, and thus the dependence on agricultural products greater. In time, agricultural opportunities allowing, such a process would result in semi-permanent villages.

It is unfortunate that in the Sierra de Tamaulipas we have not been able to fill the gap in our sequence just after Almagre times. The evidence from the Panuco area in the Pavon and Ponce Phases and from southwestern Tamaulipas in the Guerra and Mesa de Guaje Phases, all of the time of the gap, may well represent the sort of community that will eventually be found at this time period in the Sierra de Tamaulipas. These might be classified as *Semi-permanent Village Groups*, groups of still greater stability and size than the semi-sedentary macro-bands.

At the end of this gap in our sequence and, I might add, in the period following Ponce and Mesa de Guaje in the adjacent areas, a new type of community pattern appears. I am calling this type of community plan *Sedentary Temple-oriented Groups*. Such communities would have had a stable food supply based on agriculture. In the Sierra de Tamaulipas this period is initiated by the peoples of the Laguna Phase and continues on into La Salta times. The stone house-platforms and temple-platforms surely mean a sedentary population. Furthermore, the construction of temples

[263] R. Wauchope, 1955.

and plazas suggests some sort of centralization of authority connected with religion. Certain communities, relatively large and composed of temples and dwellings, appear to have been regional foci for nearby non-temple villages. Members may have occasionally left the village in small groups to hunt, to plant, and harvest distant fields, and the like.

While the basic community pattern stays the same during the Laguna, Eslabones, and La Salta Phases, there is a gradual change within this general class. Eslabones sees the concentration of villages on defensible hilltops and not in vulnerable valleys, as they are occasionally situated during Laguna times. This was probably a response to external pressures or threats. However, in spite of these threats, the population seems to have increased during Eslabones times. The La Salta Phase sees communities of slightly smaller size, fewer and smaller religious edifices, and with the sites still in defensible positions. Certainly the lesser religious manifestations must mean that the centralized authority had been considerably weakened. The decline in population concentration may reflect a poorer food supply (which might be due either to problems in production or distribution or both).

The final period in the Sierra de Tamaulipas sees a regression in the trend of community patterning. Los Angeles communities are definitely smaller, and many of them are seasonal camps for macro-bands as well as semi-permanent villages, but, more significantly, there are some camps of nomadic micro-bands. In the course of the year, the Los Angeles people apparently would maintain a base village, but sections of the community would leave from time to time to collect wild plants when ripe or to hunt when food was scarce. Whole villages may have been forced to move from time to time because of warfare, lack of water, or depleted soils.[264] It may be inferred that in this period something caused the decline in the food supply, and with this diminution came a decline in population concentration. Furthermore, the outward manifestations of centralized authority connected with religion seem to have disappeared. It might be added that the more aesthetic aspects of the preceding periods also seem lacking.

In conclusion, the sequence in Tamaulipas seems to show a long period of development from nomadic micro-bands to seasonal macro-bands to semi-sedentary macro-bands. This is followed by a relatively rapid shift (possibly passing through a stage of semi-permanent village groups) to a period of sedentary temple-oriented groups, which continued for some time. Then came a rather rapid regression to semi-permanent village groups.

TYPES OF SETTLEMENT

Temporary Open Camps

Four components of the Lerma Phase and one each of the components of Nogales, La Perra, Almagre, and Los Angeles are of this type. All are in the open, near water. Chips or areas darkened by refuse (charcoal and rotted vegetation) cover areas from 4 to 100 feet in diameter (averaging about 45 feet in diameter), and the few places where layers of refuse could be observed revealed them to be always less than 3 inches thick.

As it is difficult to imagine more than ten people living in such a small area, I estimate the population of these camps as from two to ten people. The lack of depth of refuse indicates temporary (one day to six weeks?) occupation.

Temporary Cave Occupations

The three excavated components of the Lerma Phase, one excavated and one unexcavated component of the Nogales Phase, one excavated Almagre component, one Laguna component, and one unexcavated component of the La Salta and of the Los Angeles Phase are of this type. Occupations all were in small caves, and refuse and chips were not abundant. Refuse layers in the excavated caves were never over 4 inches thick and covered areas of less than 1,500 square feet. For the same reason given above, I suspect that these were also temporary occupations by tiny groups.

Seasonal Camps

We found many camp-sites each of this type belonging to the Nogales, the La Perra, and the Los Angeles horizon, plus two that are Almagre components. Chips and artifacts in these sites are spread over an area of from 100 to 600 feet in diameter. Refuse is usually at least 3 inches thick. These camps are found both in valleys and on hilltops.

Although there is a chance that some of these camps represent a series of temporary ones that were adjacent to each other, it is not too likely. The reason for saying this is that many cave occupations with preserved refuse (Tm c 314 and Tm c 174) of the same time period are quite definitely seasonal and were deposited by groups of, probably, from six to twenty people. Thus I estimate that these sites are seasonal camps (of possibly two to six months) by groups of from perhaps six to twenty people.

Seasonal Cave Occupations

Thirty-one seasonal cave occupations occur, representing all phases from Nogales to Los Angeles times. Refuse in the caves is from 3 inches to 2 feet thick and covers an area from 40 to 200 feet in diameter. In Layers 2 and 3 of La Perra Cave as well as the three refuse lenses of Layer 1 of Tm c 314, there were seeds of *Dioon edule*, which blooms in the early spring, and maize specimens, most likely harvested either at the end of the rains in May, or in the autumn.

These vegetal remains suggest that these sites were probably seasonal collecting camps like those above.

[264] Hack, 1942.

TABLE 17

DISTRIBUTION OF TYPES OF SETTLEMENTS IN SOUTHEAST TAMAULIPAS

Cultural phase	Number of components	Temporary open camps	Temporary cave occupations	Seasonal open camps	Seasonal cave occupations	River bottom villages or hamlets	Valley ceremonial centers	Hilltop ceremonial centers	Hilltop villages or hamlets
Los Angeles	29	1	1	3	16	8			
La Salta	8		1		1	1		1	4
Eslabones	7				2			4	1
Laguna	19		1		1	1	5	9	2
Almagre	10	1	1	2	4	2			
La Perra	8	1		3	4				
Nogales	18	4	2	9	3				
Lerma	7	4	3						

Simple River-bottom Villages

The villages are very similar to the seasonal camps and historically probably were a gradation from the latter. However, they differ from the seasonal camps in three ways. First of all, they are usually bigger, ranging from areas 400 to 1,000 feet in diameter. Secondly, the presence on many of these sites of wattle-and-daub or of stone house-platforms indicates the existence of fairly permanent dwellings. Thirdly, they are all on terraces in valleys.

These seem to be permanent villages of groups of from ten to one hundred people. They belong to Almagre, Laguna, La Salta, and Los Angeles Phases whose subsistence was based on agriculture. The Laguna and La Salta ones may have been villages or hamlets around larger ceremonial centres.

Valley Ceremonial Centres

These occur only in the Laguna Phase. Characteristically they have house-platforms or areas of occupation around temples surrounding plazas. Refuse runs from 1 to 6 feet in thickness and may cover an area from 1,000 to 4,000 feet in diameter. There are from thirty-five to 300 house-platforms. Populations may have ranged from 100 to 2,000 people. I suspect these were permanent villages which had ceremonial centres and a priestly hierarchy for the local people as well as for those in the surrounding hamlets.

Hilltop Ceremonial Centres

This type of settlement is predominant in the Laguna (nine) and Eslabones (four) Phases, though one La Salta ruin of this type occurs (and even it may have been first built in Eslabones times). Most of these are on the top of steep-sided hills and could have been easily defended. As well as domestic house-platforms, each has a plaza area surrounded by temple-platforms. As far as Tamaulipas is concerned, the largest structures appear at this type of site. Because of the terrain and vegetation, areas encompassed by these sites were often difficult to determine. However, they range from at least 900 to 5,000 feet in diameter, and have from 10 to 1,000 house-platforms. Many also have such public works as terraces, pavements of rock, and *tanques*, and one has a ball court. From 100 to 6,000 people could have lived at these sites. These seem to be villages with ceremonial centres.

Small Hilltop Villages

This kind of village is predominant in La Salta times, though two occurred in Laguna and one in Eslabones. These are small hilltop villages from 300 to 1,000 feet in diameter, with or without a few house-platforms and with or without a few temple mounds. However, there never are discernible plaza areas. It has been suggested that these were hamlets around ceremonial centres, but with the exception of Tm r 78 and Tm r 79, none are near large ruins of the same period. Thus I consider them small independent villages with their own local, relatively unimpressive religious shrines.

15. VEGETAL AND FAUNAL REMAINS

An analysis of the vegetal and faunal remains associated with components of various phases from layers or levels of the cave excavations revealed changes in the environment and in the subsistence pattern. The sample of faunal remains comprises 1,234 bones, of which 577 were identifiable. The sample of identifiable floral remains is made up of 5,101 items.

All the bones except obviously unidentifiable scraps (and a beaver tooth identified by A. W. Cameron of the National Museums of Canada) from Tm c 174, Tm c 81, and Tm c 82 were sent to Dr. C. W. Hibbard of the Museum of Palaeontology of the University of Michigan, who, in cooperation with Dr. J. Hooper, Curator of Recent Mammals, Dr. J. Peters, and Dr. Henry Van der Schalie, of the Museum of Zoology, identified these remains. With this identified collection as a type sample, I later matched them with the remains from Tm c 314 and Tm c 315.

The maize remains were studied and classified by Dr. P. C. Mangelsdorf of the Botanical Museum of Harvard University [265] (fig. 46); the cucurbit remains were identified by Dr. W. A. Whitaker of the Horticultural Crops Research Branch of the United States Department of Agriculture at La Jolla, California; [266] and the beans were classified by Mr. Lawrence Kaplan of the Missouri Botanical Gardens. The wild plant materials, because of their bulk and the difficulties of transporting them from Mexico, presented more of a problem. Therefore, I segregated the plant materials from all but one excavated square into forty-four different kinds of specimens. A specimen of each type sample, as well as the plant remains from all levels of one square from Tm c 314 and one from Tm c 174, was then sent for identification to Dr. C. Earle Smith, then of the Botanical Museum of Harvard University (fig. 47). Once the materials were identified, the taxonomic names were substituted for my preliminary forty-four classes of plants. Since the identified materials contained fewer species than the number of type samples, it is very probable that no species were overlooked in my original sorting.

The bone material, which is more adequately represented in more horizons, (though still not large enough for a definitive study) reflects changes in the climate and local environment. In this study, once the bones were identified, they were arranged in sequence with their associated cultural phase (*see* table 18).

The Lerma faunal remains, most of which were mineralized, contained three genera: *Mazama* (red tropical deer), *Castor* (beaver), and *Odocoileus* (white-tailed deer). One of the teeth of the *Odocoileus* was extremely large for the species. In terms of environment, the predominance of *Mazama* remains over that of *Odocoileus* may be an indication of a more tropical and wetter habitat. The beaver tooth also indicates a wet environment. Thus, during the Lerma Phase the climate probably was wetter than at present and the vegetation perhaps tropical (Goldman's "Lower Humid tropical Biotic Zone").[267]

These bones contrast with those from the Nogales Phase, which has *Odocoileus, Felis* (jaguar), and Nasua (coatimondi). These certainly seem to indicate a drier climate and a more desert-like habitat, perhaps like that found today in the Sierra de Tamaulipas [268] (Goldman's "Lower Austral Biotic Zone").

Another shift takes place during La Perra times when once again the red tropical deer is slightly more prevalent than the white-tailed deer. This would seem to indicate the beginnings of a wetter phase, though not so humid as that of Lerma (perhaps an environment like Goldman's "Arid Upper Tropic Biotic Zone" [269]). Peccary, jaguar, coatimondi, rabbit, turtle, rattlesnake, rodent, *cryphrellus*, birds, and dog also occur.

From Almagre times through La Salta a similar complex occurs but with *Mazama* diminishing as *Odocoileus* increases. Thus from La Perra to La Salta the over-all trend was of a humid climate gradually becoming drier. This increasing dryness reached its culmination in the Los Angeles Phase, where only one *Mazama* tooth with sixty fragments of *Odocoileus* occurred. All the other animals were the same as those found at present in the Sierra de Tamaulipas. Thus by Los Angeles times, the region was in the Lower Austral Biotic zone.[270]

The floral remains of La Perra, Laguna, and Los Angeles tend to confirm the osteological conclusions, though in a less definite manner and of course not for the whole sequence (*see* table 19). The presence of *Lonchocarpus, Froechlichia*, and *Marsdenia* in La Perra and Laguna indicates a climate slightly wetter than at present. The *manihot* seed and leaf of Laguna (which is probably not wild) lends a bit more support to this hypothesis. The absence in Los Angeles of these wetter climate plants and the increase of *yucca, sabal, opuntia*, and *cacti* show it to have been the driest of the three phases (*see* table 19).

Besides indications of climatic change, the analysis of the plant and animal remains from these horizons produced information on food habits, nutrition, and subsistence patterns of the La Perra, Laguna, and Los Angeles peoples.

Ideally the food remains from these three phases should be studied from two standpoints. One would be the transposition of the food remains into proteins, carbohydrates, and fats (calories) and the other nutrients and the food energy units per horizon compared. Unfortunately, nutritionists have not given the calorie and nutrient breakdowns of all the kinds of plants found in the caves. The other would be the calculation of the man-hours required in the various subsistence activities indicated in the cave remains. But neither ethnographic research nor modern experimentation gives us sufficiently vigorous and extensive data on this point.

All that our data allow us to do is to calculate the bulk or volume of food that the ancient inhabitants brought into the caves. It is assumed that these remains brought into the caves reflect the relative volumes of types of food consumed and exploited. These foods may be separated into those obtained by hunting, by gathering, and by agriculture. From one horizon to another the proportions of each of these three major categories of foodstuffs change. It seems reasonable to conclude that these changes reflect shifts in subsistence activities. However, within any one horizon we must remember that the relative proportions of the three categories of foodstuffs do not necessarily correspond di-

[265] Mangelsdorf, MacNeish, and Galinat, 1956.
[266] Whitaker, Cutler, and MacNeish, 1957.
[267] Goldman, 1951.
[268] *Ibid.*
[269] *Ibid.*
[270] Goldman, 1951.

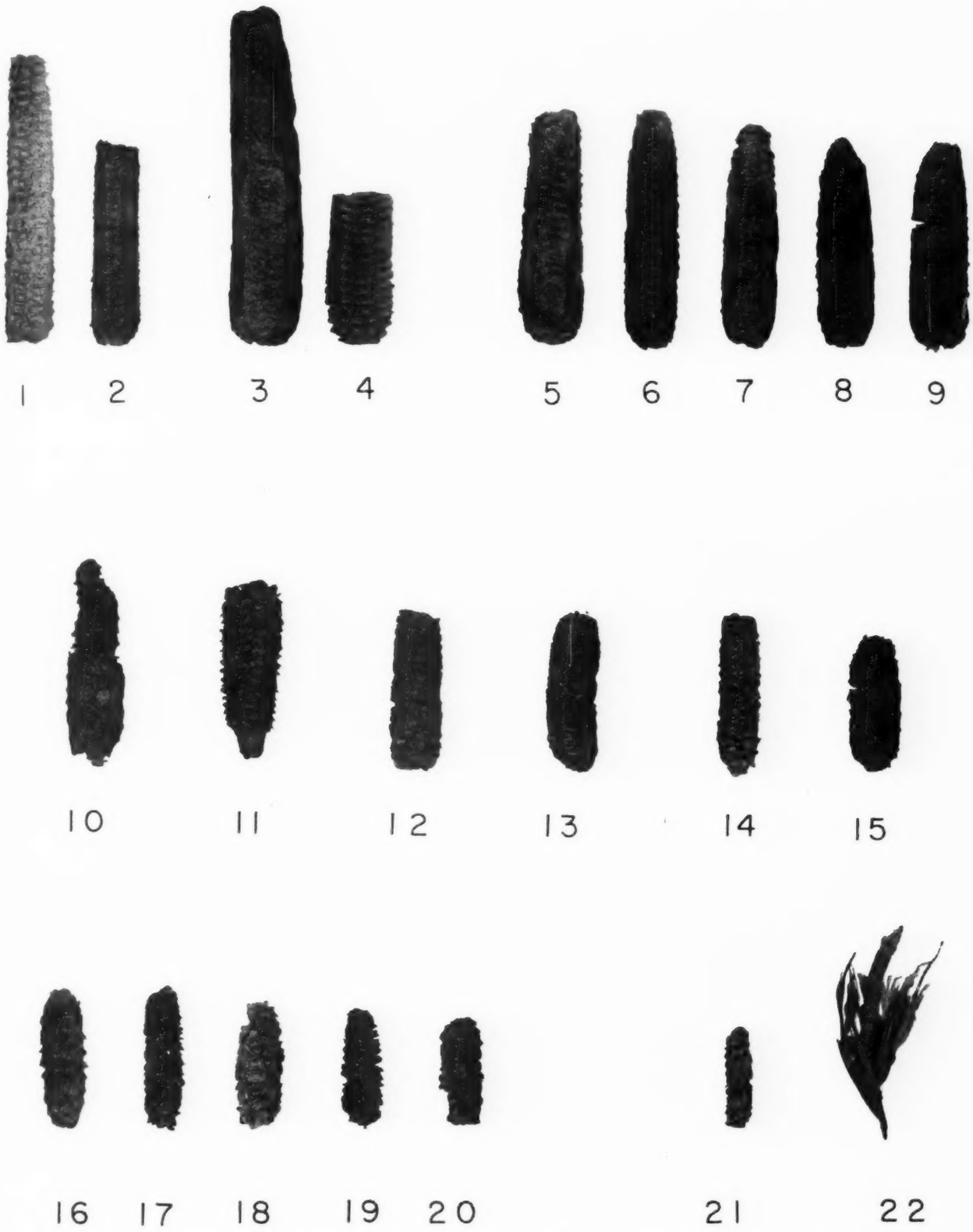


FIG. 46. Races of corn (1/2 natural size). 1–2. Breve de Padilla. 3–4. Dzit-Bacal. 5–9. Late Nal-tel. 10–15. Early Nal-tel B. 16–22. Early Nal-tel A.

TABLE 18

DISTRIBUTION OF BONES IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components		Total bones	Unidentifiable bones	Unidentifiable mineralized bones	*Castor*..... tooth	*Mazama*.... femora	teeth	phalanges	tibia	mandible	calcanei	ulna	metapoidal	*Odocoileus*.. teeth	tibia	ulna	calcanei	astragulus	phalanges	metapoidal	antler	metatarsial	femora	vertebrae	pelvis	*Pecarri*..... teeth	mandible	tibia
		Mammalia																											
Los Angeles	Tm c 81, layer 1		92	68											3	1			1	4						2	1		
	Tm c 82, layer 1		91	7											6	6	2		2	3					1	1	1		
	Tm c 82, layer 2		19	3											1	1	1		3			1							
	Tm c 314, layer 1		136	63											17	2	1	1	2			1	2	2	4	1	4		
La Salta	Tm c 314, layer 2		30	13			1	2			1				2												2		
Eslabones	Tm c 81, layer 2		98	86	2			1			2					2		1									1		
	Tm c 82, layer 3		29	9												2											1		
Laguna	Tm c 174, layer 1		117	43					2	1		2	1		15	3	1		2	6	1	1			1				
Almagre	Tm c 82, layer 4		13	4			2	1		1			1	1	4				2								2		
	Tm c 314, layer 3		36	12			1	6					3	1	2	1	1	2	1	3	1	1					2		
	Tm c 315, layers 5 6		107	48			2	4	7	2									1								1		
La Perra	Tm c 315, layer 8-9		134	69				9	2	2				1	4	1			1	1							7	7	1
	Tm c 174, layer 2		68	29				1	3	4	1	1			2	1			1				2					1	
	Tm c 174, layer 3		14	3				1	3	2		1										4							
	Tm c 82, layer 5		8	7																									
Nogales	Tm c 82, layer 6		16	9																						1			
	Tm c 81, layer 3		40	34	1											2	1			1		1						2	
	Tm c 314, layer 4		53	29											7	1	1		1	1		3		5					
	Tm c 82, layer 7		35	29											1		1	1	3										
Lerma	Tm c 174, layer 5		27	13	11					2						1													
	Tm c 174, layer 6		34	10	21				1	1					1														
	Tm c 81, layer 5		30	2	26	1		1																					
Diablo	Tm c 81, layer 6		6		6																								
	Tm c 315, terrace gravels		1																										
	Total Bones		1234	590	67	1	6	27	18	15	4	5	5	4	65	24	9	11	22	21	9	11	4	9	6	5	22	14	5

TABLE 18—*Continued*

| Phase | Excavated components | Mammalia | | |

TABLE 19

DISTRIBUTION OF SHELLS AND NON-EDIBLE WILD PLANTS IN THE SIERRA DE TAMAULIPAS

Phase	Excavated components	Total shells	Total plants	Non-edible wild plants												Shells						
				Lonchocarpus hondurensis seeds	*Setaria geniculata* seeds	*Bromelia* leaves	*Carya* endocarp	*Caesalpinia* pods	*Herbita* leaves	*Esenbeckia* seeds	*Esenbeckia* capsule	*Marsdenia* capsule	*Cuphea* capsule	Legume cotyledons	Yucca seeds	Yucca pods	Conch fragments	*Strophostyla*	*Medallia* sp.	*Balimulus* sp.	*Eseylardina* sp.	*Pedyclaritas* sp.	*Cedocentrum*
Los Angeles	Tm c 81, layer 1	5																		2			3
	Tm c 82, layer 1	3																		2			1
	Tm c 82, layer 2	5																		1			1
	Tm c 314, layer 1	18	40			3	2	1	14						9	11	2			10		1	8
La Salta	Tm c 314, layer 2	2																		2			
Eslabones	Tm c 82, layer 3	7																	3	4			
	Tm c 81, layer 2	3																		1			2
Laguna	Tm c 174, layer 1	7	383	73	11	92	1	11	158		5	5	6	17	3	1				7			
Almagre	Tm c 82, layer 4	8																	4	4			
La Perra	Tm c 82, layer 5	21																	14	7			
	Tm c 174, layer 2	93	154	104	2	18		16	11	2		1					1		9	83			
	Tm c 174, layer 3	19	5	1	2	1	1													19			
Nogales	Tm c 82, layer 6	4															2		1	1			
	Tm c 81, layer 3	3																		3			
	Tm c 82, layer 7	2																		2			
Lerma	Tm c 174, layer 5	7																	2	4		1	
	Tm c 174, layer 6	12																		9	3		
	Tm c 81, layer 5	8																2	5	1			
	Totals	227	582	178	15	114	4	28	183	2	5	6	6	17	12	12	5	2	38	162	3	2	15

rectly to the relative importance of each in the struggle for survival. Volume does not necessarily equal value.

In this investigation, once the vegetal and faunal materials were identified and counted, and their cultural provenience determined, it was necessary to transpose the gross number of each kind of specimen into a common unit of bulk. The unit chosen was a litre. By making plasticine models of the various food particles represented by the vegetable remains, it was possible then to determine how many of them it would take to fill a litre container. Thus the quantity of each kind of vegetable food could be expressed in terms of litres by dividing the number of specimens of each food present in an archaeological level by the predetermined number necessary to fill a litre. With the bones it was easier to calculate the volume of food represented, for the Canadian Wildlife Service has tables which show how much meat or edible food may be obtained from various bones or parts of a number of animals (more or less comparable to ones in Tamaulipas).

Almost all the vegetable food for the La Perra occupation came from Layers 2 and 3 of the three southwesternmost five-foot squares of Tm c 174. Of this vegetable food 2,568 specimens were recovered, 31 snail shells and 11 identifiable bones. These have been determined to represent 19.77 litres of food.

Some of the food remains are from domesticated plants. Two seeds from layer 3 and three seeds and a piece of rind from layer 2 of *Cucurbita pepo* are thought to have belonged to two whole squash, which comprise one litre of food (*see* table 20). Corn is represented by one quid, three husks, two cob fragments (probably Early Nal-tel Type B), thirteen Early Nal-tel Type B and two Early Nal-tel Type A whole cobs (fig. 46, *d–f*). Early Nal-tel A averages nine rows with fifteen kernels to each row.[271] Therefore the two cobs and the quid represent 405 kernels of a size that results in 4,800 kernels per litre. Thus they comprise .09 litre of food (*see* table 20). Early Nal-tel Type B averages ten rows with twenty kernels to each row.[272] The kernels are larger, only 4,000 per litre, and the thirteen cobs and two fragments had 3,000 kernels or .75 litre. In total, agricultural products compose 1.84 litres or 9 per cent of the food in the La Perra horizon.

The dominant plant remains of the horizon are *Dioon edule*. There were 14 bases, 31 bracts, and 1,621 seeds of this plant. Since 200 of these acornlike seeds fill a litre, 8.10 litres occur. *Pithecelobium confins* seeds, 44 in number, and 429 pods (containing 8 seeds per pod) represent 3,432 seeds, and since there are 720 seeds of this size per litre, the total quantity is equal to 4.77 litres. Next in importance are 148 chewed cuds of *Agave* (as well as 66 unchewed ones), which have been calculated to represent 1.48 litres of food, since about one hundred cuds could be stuffed into a litre can. The

[271] Mangelsdorf, MacNeish, and Galinat, 1956.

[272] *Ibid.*

FIG. 47. Vegetal remains (1/2 natural size). 1. *Froelichia* chewed. 2. *Agave* chewed. 3. *Cucurbita pepo* stem. 4. *Cucurbita pepo* seed. 5. *Dioon edule* seed. 6. *Pithecelobium* seed. 7. *Lonchocarpus hondurensis* seed. 8. *Phaesoleus vulgaris* seed. 9. *Sabal* seed. 10. *Cordia boissieri* seed. 11. *Pithecelobium* pod.

final important wild life food plant was 79 *sabal* seeds. Since it takes 600 of these seeds to make a litre, these represent .13 litre. Other collected foods consist of 30 *Cordia boissieri* seeds (.11 litre), 13 *Opuntia* stems (.25 litre), two *Cactaceae* fruits (.12 litre), two quids of *Froechlichia* (.02 litre), and 31 snail shells (.10 litre). In total there were 15.08 litres of wild plant or collected food that the La Perra peoples had collected (*see* table 20). This represents 76 per cent of their total food in our sample.

Bones associated with the preserved food remains of Layers 2 and 3 of Tm c 174 were scarce. They consisted of three phalanges (.15 litre of meat); a tibia (.30 litre of meat); and three ulnas of *Mazama* deer (.24 litre of meat); a femur of *Odocoileus* (.66 litre of meat); a femur of a jaguar (1 litre of meat); and two bird leg-bones (.50 litre of meat). Wild meat thus was represented by 2.85 litres of food or 15 per cent of the total food volume (*see* table 20).

A closer scrutiny of some of the foodstuffs reveals a few additional facts. Since some of the bones, mainly the identifiable scraps, had their interiors scraped, marrow (not figured in the above calculations) was also a food. Eleven human feces gave additional information about what the La Perra people ate and confirmed the conclusions that they were primarily food-gatherers. A very superficial analysis of the feces revealed two with grasshopper wings and legs, as well as three with *Agave* fibres, one with a possible squash seed, and two peppered with snail shell fragments (some uncomfortably large).

Mangelsdorf and Galinat's study reveals further facts concerning their food habits.[273] One was that a couple of maize ears from this horizon were charred, and of these one has mainly its glumes charred but not its rachis. The significance of the latter specimen is that the cob with its attached kernels was probably scorched, resulting in a roasting ear if the maize was immature or in popcorn if it was completely ripe. Another fact is that few, if any, of the glumes from this horizon are battered or broken, suggesting that corn was not shelled (or the kernels ground) but was eaten on the cob. (This tends to confirm the conclusion that the La Perra mulling stones were used for wild foods, not corn.) Finally, one quid suggests that some of the young ears were chewed, husk and all; juice containing sugar and other nutrients were sucked out, and then the remaining mass was expectorated.

In summation, archaeological data lead to the conclusion that the people of the La Perra horizon primarily foraged for wild plant foods (76 per cent by volume), did some hunting (15 per cent) and a little incipient agriculture (9 per cent). Three inferences may be drawn from the above data. First, they were in all likelihood frequently on the move. As the kinds of plants that they gathered ripened only at one or two times a year, they would have had to move on to gather other foods or to hunt when each limited supply was consumed. Secondly, in terms of the present environment, or even a possibly somewhat more favorable one in the past, small groups of people would have had to exploit a very large area to keep alive. And, finally, there was an unfavorable ratio between the energy obtained from their food and the energy used in getting the food which would have left them little time to devote to other aspects of their culture. About 40 per cent of their food energy, in terms of calories, was from hunting, which would have required a great deal of effort. Another 40 per cent of their food energy came from a huge mass of wild foodstuffs, which would have been perhaps easier to obtain than the flesh foods but still would have taken a considerable length of time to accumulate in great enough quantities to satisfy hunger. Agriculture gave them only about 20 per cent of their food energy. Although it probably took the least effort, it was the least utilized. Even though the process of plant domestication was well understood by some peoples at this time, certainly the potentialities of agriculture were not well exploited by the La Perra peoples (*see* table 20).

All the Laguna preserved food remains came from Layer 1 of the two southwesternmost five-foot squares of Tm c 174. They consisted of 1,920 vegetable food remains, 2 snail shells, and 12 identifiable bones, composing 23.72 litres of food. During this time period a wide variety of domesticated plants were utilized. Common beans (*Phaseolus vulgaris*) and manioc (*Manihot*) are represented by a single seed apiece and are too small to calculate in terms of litres. However, a single gourd seed (*Lagenaria* sic.) and 9 *Cucurbita fica* seeds are considered to represent whole plants, being .50 and .25 litre of food, respectively. Four stems, 3 rind fragments, and 4 seeds of squash (*Cucurbita pepo*) are, on the basis of the stems, considered to represent 4 whole plants, or 2 litres of food. Maize is represented by 53 leaves, 2 quids, and 101 cob fragments. Two quids and 22 cobs are Early Nal-tel Type A and represent .68 litre of food. Twenty-nine cob fragments and 23 whole cobs seem to be Early Nal-tel Type B, and represent 2.60 litres. There were some new corn races, and one of these, Late Nal-tel, was represented by 18 cobs (fig. 46, C). This race averages 11 rows per cob and 25 kernels to a row. Since 2,500 kernels of this type filled a litre can, it has been calculated that the archaeological specimens represent 2 litres of food. Six cobs of the Dzit-Bacal type (fig. 46 A), with 9 rows and 35 kernels to a row, and with the same kernel size as Late Nal-tel, represent .75 litre of food, while three cobs of Breve de Padilla (fig. 46 B), with 12 rows (and 35 kernels to a row and with the same kernel size as Dzit-Bacal and Late Nal-tel) represent .50 litre of food. In total there are 9.28 litres or 40 per cent of food re-

[273] Mangelsdorf, MacNeish, and Galinat, 1956.

TABLE 20

ESTIMATES OF THE BULK FOOD REMAINS FOR THE LOS ANGELES, LAGUNA AND LA PERRA PHASES IN THE SIERRA DE TAMAULIPAS

Phases/Components—Categories	Total Food Remains	Total hunted wild animal (bone) remains	*Chelonia* shell	*Aves*	*Lepus* femora	*Lepus* tibia	*Lepus* phalange	*Nasua* tibia	*Felis* femora	*Odocoileus* metatarsal	*Odocoileus* phalange	*Odocoileus* femora	*Mazama* femora	*Mazama* ulna	*Mazama* tibia	*Mazama* phalanges	Total gathered edible wild plant (and snail) remains	Snail shells (all types)	*Froechlichia* chewed	*Froechlichia* bases	*Cactaceae* fruit	*Opuntia* stems	*Opuntia* leaves	*Cordia Boissieri* seeds	*Sabal* seeds	*Sabal* leaves	*Agave* chewed	*Agave* unchewed	*Pithecelobium* seeds	*Pithecelobium* pods
Los Angeles Tm c 314, layer 1																														
a. Number of specimens	1120	18	6	1			4	1		2	1						1030	6					3	11	2		55	57	15	179
b. Number of units of food			1	1			4	1		2	1							6				13	3	11	2		55			1432
c. Number of units of food per liter			4	4			50	10		12.5	16							320				50	12	272	600		100			720
d. Liters of food (bulk)	15.57	2.90	.25	.25			.08	10		1.16	.06						6.55	.02				.25	.25	.05	.00		.55			1.99
e. Percentages of food	1.00	.18	.02	.02						.01							.42					.02	.02				.03			.13
Laguna Tm c 174, layer 1																														
a. Number of specimens	1934	12		.3		2		1		1	1		1				1742	2	3	1	3	20		49	54		223	141	103	561
b. Number of units of food				.3		2		1		1	4		1					2	3	1	3	20		49	54		223			4488
c. Number of units of food per liter				.4		16		10		12.5	16		1.5					320	100	50	16	50		272	600		100			720
d. Liters of food (bulk)	23.72	1.96		.75		13		10			24		.66				12.48	.00	.03	.02	.19	.40		.18	.09		2.23			6.25
e. Percentages of food	1.00	.09		.03		.01		.01		.08	.01		.03				.51				.01	.02		.01			.09			.26
La Perra Tm c 174																														
Layer 1. *a.* Number of specimens	1828	10		.2					1				1		1	3	1805	24	2		2	13			7	1	45	25	44	260
Layer 2. *a.* Number of specimens	782													.3	.3	.3	767	7							4	1	103	41		169
b. Number of units of food				.2					1					.3	1	.3		31				2			79		148			3432
c. Number of units of food per liter				.4					1				1.5	12	.3	20		320	100		2	13		30	600		100			720
d. Liters of food (bulk)	19.77	2.85		.50					1.00				.66	.24	.30	.15	15.08	.10	.02		.16	.50		272	600		100			4.77
e. Percentages of food	1.00	.15		.03					.05				.08	.01	.02	.01	.76				.12	.25		.11	.13		1.48			.24
Total Number of Specimens	5664	41	6	6		2	4	2	1	3	5	5		3	1	3	4340	39	5	1	5	46	3	90	135	2	426	264	147	1109
Total Liters of Food	59.06	7.71	.25	1.50		13	.08	20	1.00	.24	.30	3.32		24	30	15	3411	.12	.05	.02	.31	.90	.25	.34	.22		4.26			13.01

TABLE 20—*Continued*

| Phases/Components—Categories | | |

mains by volume which come from domesticated plants (table 20).

Mangelsdorf and Galinat's closer study of these remains revealed a few additional facts about the use of these foods.[274] As in the previous period, a few cobs are charred, so we know that popcorn or "roasting ears" were eaten. There were also a couple of quids, indicating that the practice of chewing whole cobs still remained. However, most of the corncob remains have the glumes broken or cut off, showing that kernels were shelled. This fact, plus the association of metates and manos, is an indication that a great deal of the corn was probably ground.

Wild foodstuffs are still numerous. *Dioon edule* seeds (618), bracts (100), and bases (56) were the most numerous wild food specimens, representing 3.09 litres. *Pithecelobium confins*, 103 seeds and 561 pods, represents 6.25 litres of food. The only other wild food plant of any importance was *agave* with 223 chewed quids and 141 unchewed fragments, which represent 2.23 litres of food. Other plants are not very important. Fifty-four *Sabal* seeds represent .09 litre. Forty-nine *Cordia boissieri* seeds represent .18 litre. Twenty *Opuntia* stems represent .40 litre. Three cacti fruit represent .19 litre. Three chewed leaves and one base of *Froechlichia* were too small to calculate, as were two snail shells. Altogether there are 12.48 litres of wild foodstuffs which represent 51 per cent of the food remains by volume (table 20).

Animal bones are not numerous and are mainly from the white-tailed deer. There were six teeth, four phalanges (the latter representing .24 litre of meat), one metatarsal equal to .08 litre of meat, and one femora or .66 litre of meat. Other foods are a tibia of *Nasua*, .10 litre; two rabbit tibia, .13 litre; and three leg bones of three different birds, .75 litre. Flesh foods represent 1.96 litres of food or 9 per cent of the total food remains (table 20). From this it appears that hunting played a very minor role in the economy. This conclusion is further supported by the small proportion of projectile points in the total tool assemblage.

The Laguna Phase, therefore, represents people who were basically agriculturists but did practice plant-foraging and a very small amount of hunting. In terms of the energy-and-culture nexus, this mode of subsistence was much more profitable than that of La Perra, for about 75 per cent of the food energy, in terms of calories, came from the activity that took the least effort, farming. Thus there was considerable time that could have been devoted to cultural activities, and, as might be expected, the material culture and its associated aesthetic and ceremonial aspects were decidedly in advance of the preceding horizons (table 20).

The final culture of the Sierra de Tamaulipas, Los Angeles, had a few preserved food remains in various patches in Level 1 of Tm c 314. As with their immediate ancestors in the region, agriculture was the most important activity of these people, but they seem to have used not quite so wide a variety of domesticated plants. Three *Cannavalia* pods and four *Phaseolus vulgaris* pods represent .03 and .02 litre of food. One stem, one rind, and five seeds of *Cucurbita pepo* and nine rind fragments of *Cucurbita fica* represent .50 and .25 litre of food. *Lageneria* seeds and a rind occur but represented too small an amount to calculate. *Zea mays* was the dominant agricultural plant with sixteen husks, three cob fragments, and twenty-nine whole cobs of Breve de Padilla (fig. 46, B). This has been calculated at 5.42 litres of corn. A total of 6.17 litres of food, or 40 per cent of the preserved diet, are agricultural products (table 20).

No chewed quids or charred cobs occurred; all the cobs found showed evidence of shelling. This fact, in conjunction with the rectangular manos and metates, indicates that maize was commonly ground. The burned carbon inside the various bowls may be the remains of some sort of gruel.

Wild food plants are scarcer at this time period; of wild food plants, 689 *Dioon edule* seeds (3.44 litres), 15 seeds and 179 pods of *Pithecelobium confins* (1.99 litres), 55 chewed and 57 unchewed *Agave* leaves (.55 litre), 3 *Opuntia* leaves (.25 litre), and 13 *Opuntia* stems (.25 litre), 11 *Cordia boissieri* (.05 litre), 6 snail shells (.02 litre), and 6 *Sabal* seeds, too small to calculate in terms of litres, occurred. These represent 6.55 litres, or 42 per cent of the food remains by volume (table 20).

In the Los Angeles horizon, hunting was apparently more important than in any phase except Lerma and, possibly, Nogales. Hunting is represented by 7 teeth, 1 phalanx (.06 litre), 2 metatarsals (.16 litre), and 3 femora (2 litres) of *Odocoileus*, 1 tibia of *Nasua* (.10 litre), 4 phlange (.08 litre) of *Lepus*, 1 bird leg bone (.25 litre), and 6 turtle shell fragments (.25 litre). In total, this is 2.90 litres of food, or 18 per cent of the food remains.

To sum up the shifts in the three categories of foodstuffs from one to another of the three cultures of the Sierra de Tamaulipas for which we have preserved organic remains (table 20): In agricultural produce from La Perra to Laguna times there is an increase by volume from 9 to 40 per cent, but between Laguna and Los Angeles there is little change. In regard to plant collecting, from La Perra to Los Angeles times there is a steady decrease from 76 to 51 to 42 per cent. The hunting pattern does not have so neat a trend in time, for there is a decrease from La Perra to Laguna from 15 to 9 per cent and then an increase from 9 to 18 per cent from Laguna to Los Angeles.

These three cultures are separated one from the other by considerable temporal gaps. The question now is, what was the subsistence pattern and changes for the other cultural phases from which we have no preserved

[274] *Ibid.*

vegetable materials? We can attempt estimates for these other horizons in three ways. First, extrapolations can be made from the trends through the three known horizons. Secondly, comparisons may be made between the unknown horizons of the Sierra de Tamaulipas and similar horizons with known subsistence patterns in the Sierra Madre of southwestern Tamaulipas.[275] And, finally, we can essay a very rough estimate on the basis of the kinds of tools and amount of bone materials.

Turning to the earliest of those horizons without preserved foodstuffs, Diablo is so poorly known and so far separated in time from La Perra (and lacking in counterparts in other areas) that no real estimate of the modes of subsistence can be made. The few bones and tools point to hunting. This, however, is all that can be said. With Lerma we are on firmer ground. First of all, the actual layers (5 and 6) of the Lerma horizon in Tm c 174, had about five times as much bone, in terms of the ratio between the number of bones and the cubic feet of refuse, as did those of the La Perra horizon. This would seem to indicate that hunting was much more important, perhaps four or five times greater, than in La Perra. This conclusion is supported by the trend of subsistence patterns in the Sierra Madre. In the Sierra Madre, there is no horizon directly equivalent to Lerma, but there is one just slightly more recent, Infiernillo. The trend backward in time, from Ocampo to Infiernillo, of the foodstuff remains is from 15 per cent (by volume) derived from hunting to almost 40 per cent. If this trend continued back from Infiernillo into the time period of Lerma, it would be expected that hunting would be over half the subsistence basis. I would estimate that between 40 to 70 per cent of the Lerma economy was based upon hunting, while between 30 to 60 per cent was based upon plant-collecting.

With Nogales we are on a much firmer basis, for it obviously developed into La Perra, and early Ocampo in the Sierra Madre is very closely related to it. In the Sierra Madre the early Ocampo horizon, bearing preserved organic remains, has hunting producing between 15 and 20 per cent of food bulk, food-collecting between 75 and 80 per cent, and incipient agriculture between 1 and 5 per cent. Furthermore, by continuing the trend from Laguna to La Perra on back to Nogales, one arrives at figures for Nogales of less than 9 per cent of subsistence by volume based on incipient agriculture, more than 76 per cent based upon food-gathering, and more than 15 per cent based upon hunting. Thus I would estimate that Nogales subsistence shifts from 80 per cent food-collecting and 20 per cent hunting in the early part of the period to about 80 per cent food-gathering, 15 per cent hunting, and 5 per cent incipient agriculture in later times.

Almagre develops from La Perra. Flacco, in the Sierra Madre, is very closely related to it. The estimate for the Flacco subsistence pattern (derived from the volume ratios of its preserved foodstuffs) is 70 per cent food-gathering, 20 per cent agriculture, and 10 per cent hunting. This fits almost perfectly with what we might expect the trend continuing immediately after La Perra to be. Thus, I believe it is safe to consider the Flacco subsistence pattern as representative of Almagre. Eslabones and La Salta fall between Laguna and Los Angeles times and are directly comparable to the Palmillas horizon of the Sierra Madre. The Palmillas horizon of the Sierra Madre has 45 per cent of its subsistence by volume based on agriculture, 50 per cent on food-gathering, and about 5 per cent on hunting. This, I think, is probably the pattern for Eslabones. La Salta may have been much the same, but, judging from the trend from Laguna to Los Angeles, I believe that hunting probably increased slightly at the expense of food-gathering.

On the basis of our study of preserved foodstuffs and the derived estimates for horizons without preserved organic materials, I believe we can fairly accurately reconstruct the changes in subsistence patterns in the Sierra de Tamaulipas (fig. 48) even though our ratios must be based only on the relative bulk of types of foodstuffs. As part of this reconstruction, I have included percentage estimates of the three categories of foodstuffs (those derived from hunting, from plant-gathering, and from agriculture). We start in early Lerma times with a hunting culture (70 per cent), which did some plant-gathering (30 per cent). During this time period there probably was a gradual shift, with an increasing amount of food-gathering being done until hunting was 40 per cent and food-gathering 60 per cent. Following the Lerma horizon there is a gap in our sequence, which, in turn, is followed by the Nogales horizon. The Nogales horizon seems to start with a basically plant-collecting subsistence (80 per cent), supplemented by some hunting (20 per cent). However, some stage of this horizon saw the incipience of agriculture (5 per cent, we may surmise by the end of the period). La Perra sees a continuation of these trends with agriculture rising to 9 per cent, food-gathering falling to 76 per cent, and hunting staying about the same (15 per cent). This trend continues into Almagre times, which sees increasing agriculture, rising to perhaps 20 per cent of the subsistence pattern, and both hunting (10 per cent) and food-gathering (70 per cent) falling slightly. Again there is a gap in our sequence in the Sierra de Tamaulipas, and in the next culture, Laguna, we have a subsistence based on agriculture (40 per cent of the food remains by volume), with some food-gathering (51 per cent), and some hunting (9 per cent). Agriculture reaches its climax during Eslabones times, being represented by 45 per cent of the food remains, with 50 per cent from food-collecting, and 5 per cent from hunting. Then there is a slight shift in La Salta times with hunting represented by 10 per cent of the remains at the expense of food-gathering and

[275] MacNeish, 1955.

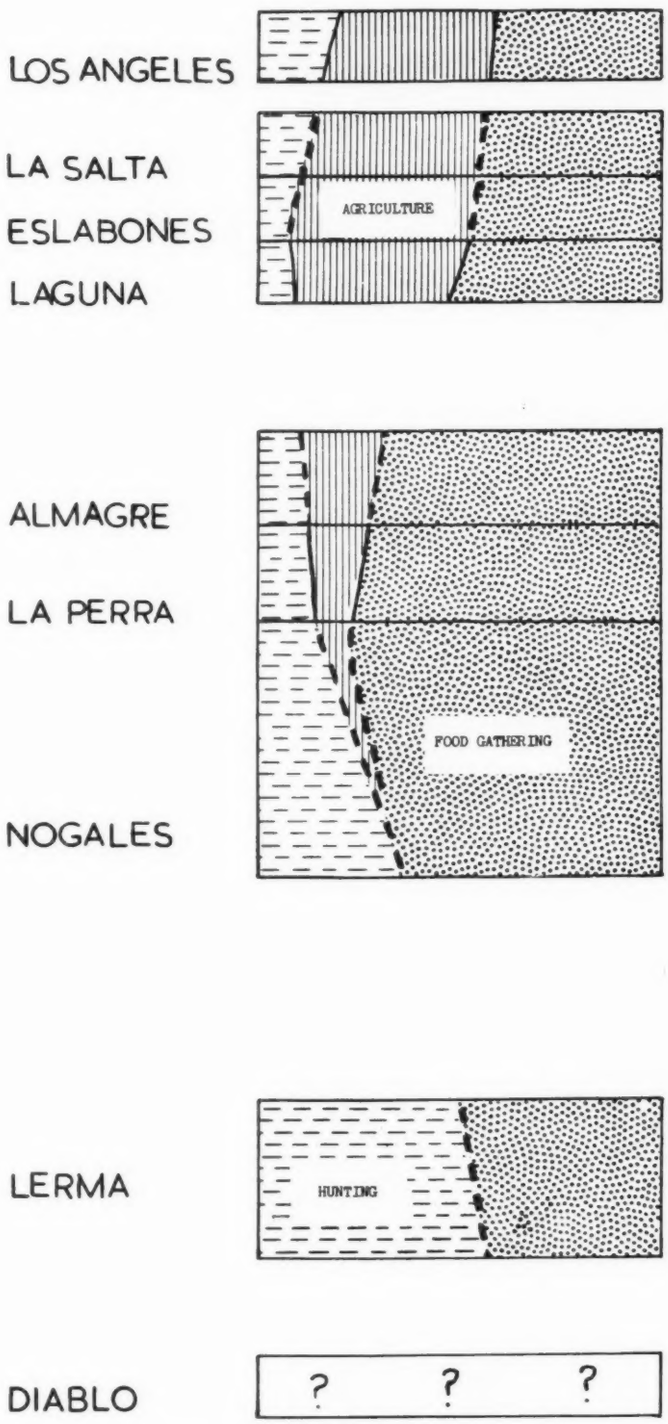


FIG. 48. Trends of subsistence in the Sierra de Tamaulipas.

agriculture, which are now 48 per cent and 42 per cent, respectively. This reversal of the trend continues in the Los Angeles horizon, for though the Los Angeles people are agriculturists (40 per cent), they did plant-collecting (42 per cent) and spent a great deal of time hunting (18 per cent).

It is hoped that eventually further work in the caves of the Sierra de Tamaulipas will produce preserved

foodstuffs for all horizons. At present, the only region in Mexico which has yielded preserved food remains over a long time period is the adjacent area in the Sierra Madre of Tamaulipas. The present data indicate that the subsistence trends in both the areas, even though the cultures are slightly different, are roughly the same.

IV. CONCLUSIONS

1. SUMMARY OF THE ARTIFACT COMPLEXES

In the second chapter of the monograph was described the stratigraphy of the various sites. Then the artifact types and their trends were presented. In this section I shall endeavor to link the two parts by a description of the artifact complexes in sequence. I feel it is worthwhile here to attempt also some reconstruction of the activities of the people of each phase, even though this entails the recapitulation of points offered in previous chapters.

In the analysis, the artifacts from the six layers from Tm c 81 were studied first. Five sequential complexes of artifacts, or components of phases, were noted: from early to late they were tentatively named Diablo, Lerma, Nogales, Eslabones, and Los Angeles. When the artifacts from the layers of Tm c 82 were analyzed, components of Nogales, La Perra, a new culture called Almagre, Eslabones, and Los Angeles were found one on top of the other. From these studies it became obvious that there was a sequence of seven phases. The excavation of Tm c 315 confirmed the La Perra–Almagre part of the sequence and added to the number of components for those phases. Analysis of the six layers of Tm c 174 confirmed the fact that La Perra followed Lerma and that Laguna and Los Angeles were still later. It also added to the number of components for these phases. Tm c 174, however, had in Layer 1, between the La Perra and Los Angeles remains, a new ceramic-bearing complex, called Laguna. The study of materials from Tm c 314 further confirmed the sequence of Nogales, Almagre, and Los Angeles, but again there was a new complex, between Almagre and Los Angeles, called La Salta. At this stage of our analysis, excavation had yielded components belonging to nine different cultural phases. Six of these—Diablo, Lerma, Nogales, La Perra, Almagre, and Los Angeles—were definitely arranged in sequence on the basis of good stratigraphy. However, between Almagre and Los Angeles there were three closely related culture complexes (La Salta, Laguna, and Eslabones) that could not be arranged in chronological order on the basis of the stratigraphy in the caves. However, excavation of the plaza at Tm r 86 revealed that Laguna pottery was under that of the Eslabones Phase, and Tm r 79 revealed Eslabones pottery under La Salta ceramics. Thus the stratigraphy found in these seven excavations places the sequence of nine artifact phases on a firm foundation.

The artifacts from each of the components of the various phases of these excavations were then compared with those from tests in open sites and surface collections found in the reconnaissance. This allowed these unstratified components to be classified into their correct phases. It also yielded new artifact types and new kinds of components. The following diagram (table 21) indicates the correlation of the components with the cultural phases.

DIABLO COMPLEX

The artifacts of the Diablo Complex occurred in Layer 6 and in the gravels of the high terrace in Cave Tm c 81. All the tools but the pebble end-scrapers are known in later horizons. Nevertheless, because of this component's geological context and because of its one distinctive artifact type, I have considered it as a separate entity. It is hoped that future excavations will uncover other components with more tools and allow this Diablo Complex to be justifiably called a phase.

The presence of these tools in the upper part of the high terrace indicates that people were living in the Canyon Diablo when it was considerably wetter than it is at present. The only evidence we have of their industrial activities are chipped stone tools. These tools are made from local flints or local pebbles. Most of the ovoid blades and choppers have been chipped bifacially by percussion. The pebble end-scrapers and the crude flake side-scrapers have been retouched unifacially by both percussion and pressure flaking. Six fragments of fossilized bone were present.

LERMA PHASE

Components of the Lerma Phase occurred in Layer 5 of Tm c 81, Layers 5 and 6 of Tm c 174, and at the surface of the west end of Tm c 305. Seventy-nine excavated artifacts were found belonging to fourteen different types. Snub-nosed end-scrapers and Lerma points (occurring at all three excavated components), gravers and stemmed end-scrapers (occurring at two of the three components), and two semi-lunar blades (occurring at one component) as well as the occurrence only of small temporary camps or cave occupations, are distinctive of the Lerma Phase. Square-based blades and choppers (present at all three excavated components), though occurring spasmodically in later phases, appear consistently only in the Lerma Phase and thus are also diagnostic of it. Ovoid bifacial blades, thin and thick flake side-scrapers, pebble hammerstones, and plano-convex end-scrapers appear in the Lerma components as well as in later pre-pottery manifestations.

The presence of *Mazama* deer and beaver (as well as the occurrence of Lerma artifacts in terra rosa soil) indicates that the climate during the Lerma occupation was very wet and perhaps cooler than at present.

The presence of high concentrations of bone in the Lerma layers as well as the projectile points, scrapers,

TABLE 21

CORRELATION OF STRATIFIED AND INDIVIDUAL COMPONENTS WITH THE SEQUENTIAL PHASES OF THE SIERRA DE TAMAULIPAS

Sites with stratified components (layers or levels)							Individual excavated components	Individual surface components	Phases
Tm c 81	Tm c 82	Tm c 174	Tm c 314	Tm c 315	Tm r 86	Tm r 79			
Layer 1	Layer 1 Layer 2	Surface	Layer 1				Tm c 83, level 1 Tm c 83, levels 2–3	Tm c 338, Tm c 220, Tm c 84, Tm c 85, Tm c 197, Tm c 198, Tm c 221, Tm c 222, Tm c 288, Tm c 290, Tm c 292, Tm c 294, Tm c 308, Tm c 311, Tm c 312, Tm c 316, Tm c 320, Tm c 325, Tm c 326, Tm c 327, Tm c 293	Los Angeles
			Layer 2			Levels 1–2	Tm r 78, house 1 Tm r 78, house 2	Tm r 90, Tm r 80, Tm c 289, Tm c 322, Tm r 323	La Salta
Layer 2	Layer 3				Levels 1–3	Levels 3–4	Tm r 6, levels 1–3	Tm c 337, Tm r 304, Tm r 311a	Eslabones
		Layer 1			Level 4 Level 5 Levels 6–7		Tm r 88, levels 1–3 Tm r 172, levels 1–4 Tm r 187, levels 1–4	Tm r 262, Tm r 301, Tm r 302, Tm c 328, Tm c 338, Tm r 223, Tm r 185, Tm r 195, Tm r 194, Tm r 310, Tm r 324, Tm r 186, Tm r 188, Tm r 196	Laguna
	Layer 4		Layer 3	Levels 1–4 Level 5 Levels 6–7				Tm c 175, Tm c 179, Tm c 291, Tm c 300, Tm c 321, Tm c 339 Tm c 305 west end	Almagre
	Layer 5	Layer 2 Layer 3		Level 8 Level 9				Tm c 317, Tm c 189, Tm c 175a	La Perra
Layer 3	Layer 6 Layer 7		Layer 4				Tm c 29, level 4	Tm c 89, Tm c 290a, Tm c 313, Tm c 176, Tm c 177, Tm c 30, Tm c 32, Tm c 21, Tm c 39, Tm c 169, Tm c 163, Tm c 190, Tm c 22	Nogales
Layer 4 Layer 5		Layer 4 Layer 5 Layer 6						Tm c 305 east end	Lerma
Layer 6									Diablo

choppers, and bifacial blades, all of which could have been connected with killing or preparing game, indicate a subsistence pattern based on hunting, though probably some plant-collecting occurred. The large size of the projectile points suggests that they were hafted to lances or darts for use in hunting. The hafted square-based blades, ovoid blades, and semi-lunar blades may have been used to cut the meat. As two slivers of bone were scraped on their interiors, it is probable that marrow was eaten. Perhaps scrapers and choppers were used to crack the bones, and the hafted snub-nosed and stemmed scrapers to gouge out the marrow. Floor X of Tm c 81 contained a large area of carbon and fire-cracked rock (which may denote roasting of meat) and burned bone.

The eight thin layers of refuse covered only small areas in Tm c 81, 174, and 305 and suggest that the Lerma people lived in nomadic micro-bands.

The only known industry of the Lerma people is the chipping of stone. The flint chipped was predominantly not from the local strata of grey chert like the later horizons. Most of it seems to have been from either pebbles or chert not commonly found in the Sierra de Tamaulipas. Percussion flaking was accomplished by the use of pebble hammerstones. All chipped artifacts, except some scrapers and choppers, were probably roughed out by percussion flaking and then finished by retouching along their edges. Choppers have only percussion flaking on them, as do a few of the ovoid blades. In making scrapers, a flake with one flat surface was chosen and the convex side shaped by percussion flaking. Then the cutting or scraping edge or the part for hafting was finished by pressure flaking, which shows in the convex surfaces.

Though we uncovered no leather, there is ample evidence that skins were worked. Skins were probably initially separated from the animals' bodies by cutting with the semi-lunar blades, or thin or thick flake side-scrapers. The fatty underside was removed from the skins by plano-convex end-scrapers held in the hand or by hafted snub-nosed or stemmed end-scrapers. Once the hides had been processed, perhaps the gravers were used to pierce them.

Although the foreign flint may indicate some outside trade contacts by these peoples, the only good evidence we have for such is the aberrant large triangular point.

NOGALES PHASE

Excavated components of the Nogales Phase are Layers 6 and 7 of Tm c 82, Level 4 of Tm c 29; Tm c 314, Layer 4; and Tm c 81, Layer 3. Tm c 290a, Tm c 176, Tm c 177, Tm c 313, Tm c 30, Tm c 32, Tm c 21, Tm c 39, Tm c 89, Tm c 169, Tm c 163, Tm c 190, and Tm c 29 yielded surface collections that are of this same phase.

Artifacts from the Nogales components are 227 in number and of twenty-nine types. Gravers, square-

based knives, choppers, and a point like Lerma double-pointed occurred in the earliest component. They are probably hold-overs from the Lerma horizon. Large chipped disks, battered nodules, skin smoothers, and mullers appear in limited numbers in late Nogales components and are innovations of types that are more typical of later horizons. Disk scrapers, Tortugas Triangular points, pebble manos, and spoke shavers appear in Lerma and in Almagre and La Perra. These are considered link traits between the three phases. There are, of course, the more general traits common to all pre-pottery horizons, such as thick and thin flake side-scrapers, ovoid blades, pebble hammerstones, and large plano-convex end-scrapers. Appearing in only one of the excavated Nogales components and not in the other pre-pottery horizons are an antler flaker, shell disk beads, shell effigy beads, tubular shell beads, and Marginella beads. The most diagnostic traits of the Nogales Phase are gouges, small chipped disks, mortars and Abasolo Round-base and Nogales Triangular projectile points. Though all these appear as minority types in La Perra and Almagre components, they are predominant in Nogales times. These distinctive artifacts, along with others, constitute a complex of types not duplicated in other phases of the Sierra de Tamaulipas.

The presence of bones of white-tailed deer, coatimondi, and jaguar, and the absence of the tropical red deer (plus geological evidence that will be presented in the following section) indicate that the Nogales Phase existed during a dry period, probably not too different from that of today.

On the basis of the subsistence patterns revealed by organic remains in the closely related early Ocampo Phase of southwest Tamaulipas as well as the similarity to La Perra it is possible to make some reconstruction of the economic activities of the Nogales Phase. It appears that the Nogales peoples were basically wild-plant collectors. The mortars tend to confirm this estimate. During the early part of the horizon there was considerable hunting, but this seems to have lessened a bit after agriculture (on a very small scale) was introduced.

The eighteen known sites belong to four types of settlements. Dominant are the nine seasonal camps, with temporary camps, seasonal cave occupations, and temporary cave occupations, occurring in that order. These suggest that a community pattern was seasonal macro-bands frequently fragmenting into micro-bands.

Hunting was of some importance, as attested by the bones in Nogales debris. It seems likely that animals were killed by atlatl darts tipped with Abasolo Round-base and Nogales Triangular and, occasionally, Tortugas Triangular points. From the gum and asphalt at the base of these points it would seem likely that these points were cemented in slots at the end of wooden mainshafts or foreshafts and the slots clamped against the points by lashings around the shafts just below the base of the points. Meat may have been cut by the ovoid blades which basal gum indicates were set in handles. Some bones may have been cracked for marrow by large irregular or small disk choppers. Burned bone, fire-cracked rock, and patches of charcoal were found in Nogales refuse.

The only industry for which we have much evidence is flint-knapping. During this phase there was great use of local chert, either the black or dark grey variety found in lenses in the limestone of the Canyon Diablo or the mottled light grey chert of Canyon Calabaza. Initial chipping and percussion flaking was accomplished by a pebble hammerstone. After projectile points, bifacial blades, disk choppers, and gouges had been blocked out into their basic forms by bifacial percussion blows, they were finished by bifacial pressure flaking with an antler flaker. In order to give some of the projectile point tips a bevelled cross-section, they were pressure flaked. Thin and thick flake side-scrapers and spoke shavers were made by retouching flat flakes on their convex surfaces. Large plano-convex end-scrapers were made from plano-convex flakes that bore percussion flaking on their convex surfaces by retouching with pressure flaking on one of the shorter edges on the same surface. Most of the scrapers of this phase do not seem to have been fashioned in such a way that they could be easily hafted.

Mortars and mullers were pecked into shape; the antler flaker shows polishing. The shell beads involve a variety of techniques. When the conch shells were imported from the Gulf of Mexico, they were first broken and the columella was removed. Next, tubular or rectangular blanks were ground from the shells' centres. The blanks were then sawed into desired lengths or widths (perhaps by a flake of flint or a thin flake side-scraper). Finally, holes were drilled through them from two sides by some sort of fine-pointed implement. Beads were made from Marginella by merely sawing off the top of their central columns.

Although we found no wooden tools, we can infer from the stone-points and blades that at least wooden dart shafts and knife handles were made. Possibly the flint gouges and spoke shavers were used to plane such wooden objects.

Scrapers showed that skins were worked. Most of these scrapers were not haftable. Side-scrapers may have been used for skinning, and plano-convex end-scrapers for removing the fat from the skin.

The Plainview point and the shells from the Gulf are evidence of trade.

LA PERRA PHASE

Excavated La Perra components were Layer 5 of Tm c 82, Layers 2 and 3 of Tm c 174, and Levels 8 and 9 of Tm c 315. Tm c 189, Tm c 317, and Tm c 175a yielded La Perra artifacts from their surfaces.

Artifacts, 335 in number, of forty different types

appear in components of the La Perra Phase. Choppers, ovoid blades, thick and thin flake side-scrapers, plano-convex end-scrapers, and pebble hammerstones are general pre-pottery traits. A Lerma point occurring in Level 2 of Tm c 174 may have been dug up from the earlier horizon and certainly is aberrant in this layer. Pebble manos, mortars, small chipped disks, gouges, spoke shavers, disk scrapers, Abasolo Round-base points, and Nogales Triangular points are traits also common to the Nogales and Almagre Phases. Almagre points, a keeled end-scraper, snail shell beads, square-based blades, mullers, and flexed burial pits are traits that begin in the La Perra Phase and carry over into the Almagre horizon. Tortugas Triangular points, large chipped disk choppers, battered nodules, and skin smoothers are types of tools that predominate only in the La Perra Phase. Also in this horizon (owing to good preservation) are double and triple yarn cords, square knots, granny knots, slip knots, over-hand knots, wound rings, stitch and weave coil baskets, full-turn coiled nets, checker-woven and twilled mats, atlatl mainshaft fragments, whittled sticks, and deer fur. Domesticated corn, Nal-tel races A and B, and domesticated dogs are also distinctive characteristics of La Perra.

The climate was warmer and wetter during La Perra times. Evidence for this is the remains of the tropical deer, and the *Lonchocarpus* and *Froechlichia* plant remains in the refuse of La Perra Cave. Also there are terra rosa soils and layers of dissolved limestone with La Perra remains.

Four of the La Perra components are seasonal cave occupations, while three are seasonal open sites. Only one temporary camp was identified. It is likely that groupings alternated between micro-bands and seasonal macro-bands, as in the previous horizon.

A study of food remains from Layers 2 and 3 of Tm c 174 revealed that wild food plants are heavily represented, 76 per cent; remains of flesh foods are at 15 per cent, and agricultural products 9 per cent.

Squash seeds (*Cucurbita pepo*) and small corncobs (Primitive Nal-tel) indicate that La Perra peoples did some gardening. However, the small number of domesticated plants in proportion to the large amounts of wild foods shows that it was an unimportant activity. Some of the cobs were masticated, the juices swallowed, and the quids spat out (as with the stalks of *agave*). Other cobs are charred, so some corn may have been popped or roasted. Squash seeds and centres were probably eaten raw or dried, as we found none charred.

Hunting was a more important part of their subsistence activities. White-tailed deer, tropical deer, peccary, and jaguar were killed by atlatl darts. These darts were mainly tipped by Tortugas Triangular points (and, in a few cases, Abasolo, Nogales, and Almagre points). They were set in gum in slots of foreshafts as in Nogales. These foreshafts in turn were inserted in mainshafts of cane with wrapped yucca reinforcements near both ends. The darts were probably propelled by some sort of throwing stick. The slip loops of yucca fibre may have been used for snaring rodents, rabbits, and birds.

Wild food plants formed the greater part of the food used by the La Perra people. The dominant wild food was nuts (*dioon edule* seeds, and *Cordia boisseria*). These were undoubtedly eaten raw and perhaps collected in net bags or coiled baskets. Almost as important were *ebano* seeds (*Pithecelobium confins* seeds). They were evidently brought into the cave in their pods and then roasted. Other leafy plants such as agave, *froechlichia*, cactus flowers, and *opuntia* (*tuna*) were also brought into the cave. They were masticated, the juice with a nutritive value was swallowed, and the quids were spat out. Snails were also collected and roasted, and the snails with their shells were eaten. Feces give evidence that grasshoppers and other insects were collected and eaten raw.

Some of the mortars may have been used to crush vegetable foods into a "palatable" dish, but I suspect much of the diet was eaten raw without special preparation. Various kinds of nuts and seeds may have been ground in mullers by pebble manos.

During the course of the La Perra occupation of Tm c 174 a child died and was buried in a pit in the back of the cave. The child was placed in a flexed position, wrapped in a net, and then deposited in the pit along with three corncobs wrapped in a string. Perhaps even at this stage this primitive corn had special ritual significance.

The flint chipping technique on the bifaces, gouges, small chipped disks, ovoid and square-based blades, Abasolo points, Nogales points, and Tortugas points, was about as previously described for Nogales. There is one difference. This concerns the completion of the Tortugas Triangular points. After they had been fashioned in rough form by percussion flaking and worked to almost complete form by pressure flaking, one or two blows were struck against the base of the point with a hammer with a convex surface. These blows, struck almost parallel to the long axis of the point, caused one or more triangular flakes to be removed on one or both sides of the projectile point body, thereby giving a basal flute.

The presence of gum or asphalt on the surfaces of some of the ovoid and square-based bifacial blades and projectile points near the base is an indication that they were hafted into slots and cemented with adhesives. Comparative evidence from southwest Tamaulipas suggests that these slots were clamped against the basal surfaces of the points by string, tightly wound around the handles or shafts just below the base of the points.

Large chipped disks and battered pebbles were made solely by percussion flaking. The battering along their edges reveals they were used as choppers and hammers.

Most scrapers were made in the same manner as those of the Nogales horizon. One type, however, is very different both in technique and manufacture, as well as

in form and use. This is the pebble skin smoother. In making these, first an elongate pebble was broken in half; then the flattened broken portion was struck from the side by percussion flaking so that the sharp edge between the pebble's original surface and the broken portion was removed. Thus the completed implement was plano-convex like a scraper, but the flat or concave side was worked and the edges were dulled rather than sharpened. Tools similar to this one are used by the Slavey and Loucheux of the Canadian Northwest for abrading leather after it has been scraped and cured or partially cured. It gives the leather a fine suede-like surface.

Mortars, mullers, and pebble manos were made by pecking, in much the same manner as those of Nogales. Shell beads, not so complexly made, consist of snail shells with a small hole ground into one of their sides.

Wood-working was another important industry. In this craft, gouges, spoke shavers, and thin flakes were the tools of the trade. One set of wooden tools consists of sticks, whittled to a point. A number of sticks from the cave had the bark scraped off, but these had not been made into complete tools. The cane mainshafts of darts were made from cane from 1 cm. to 25 mm. in diameter, the end of which had been sawed. Both ends have fibres wrapped around them for reinforcement. One end bears evidence of wear on one interior edge. This may be the result of the spur of the atlatl itself having worn the interior proximal end of the shaft through repeated use. The atlatls themselves were probably also of wood, though we never found one. The distal ends of the atlatl mainshafts had been ground evenly on all surfaces of the interior. This, I believe, is a result of wear from the detachable wooden foreshaft to which the point was, in turn, attached.

A few bird leg bones had been ground to points for use either as awls or as sewing needles.

We were fortunate in obtaining a little information concerning the textile complex of the La Perra people. Much of the string of the La Perra people was merely fibres of yucca or agave that had been cut into strips. These strips probably had a variety of uses, and many of them are knotted. The most common knot is the square one. This seems to have been used either for tying two different pieces of yucca together to make a long string or for making loops in a single piece of string. Perhaps some of these loops tied with a square knot were used in carrying. Granny knots and simple overhand knots occurred. One piece of yucca contained a slipknot. This could have been used in carrying but also could have been part of a snare. However, all the string was not in simple strands. Much of it was made from fine fibres of maguey that had been twisted clockwise to make a string, very possibly formed by rolling the fibres downward against the thigh by the palm of the right hand. Many of these initial yarns were then twisted together counter-clockwise to form two-yarn or three-yarn cord. These yarns may have been rolled with the palm of the hand upward against the thigh. Their irregularity and thickness seem to indicate that they were not twisted on a spindle whorl. Some of this string was woven into simple full-turned coiled netting. The netting on the burial indicates that some of these nets served as clothing or blankets.

Baskets and mats were also manufactured. The baskets were coiled with a solid rod foundation. Initially, two rod circles were tied together by yucca strands, which were first wrapped around the lower rod a number of times, then passed to the upper rod from left to right, then wrapped around it a number of times, and finally passed back to the lower rod. In such a way progressively larger rod circles were added and eventually formed a loosely-woven basket. It has been suggested that the bone awls may have been used in the stitching of the yucca fibres. I am not too sure that the bone awls we found were so used, because they were extremely sharp and had narrow points. Perhaps the whittled wooden points were used instead of bone ones. Mats were made from palm fibres. In one of the mats woven one-over-one, the single strand passes diagonally across the surface of the mat and folds at the edge at right angles, and again diagonally crosses the mat. As the corners of the mat were oblique to the main axis and the other strands crossed at right angles over one of these original oblique strands and then below the next, the work evidently began at the corners. There was one mat of slightly finer quality, made in the same form, in which the strands passed over-two and under two. Since in the succeeding horizon, mats were found in beds of leaves, I conjecture that these early La Perra mats may also have been used as part of the bedding.

One piece of deer hide, with one side scraped and fur adhering to the other, gives us a specimen of the leather work. The fleshing and scraping process was probably the same as described for Nogales. However, possibly one additional process was undertaken; i.e., in the final stages the pebble skin smoothers may have been employed to give it a suede-like finish. The juice made from soaking seeds of *Lonchocarpus hondurensis* may have been the chemical used for curing the hide. A microscopic examination of the piece of deer hide revealed some minute particles of carbon in it. This may mean that the hides were also smoked.

A single side of a conch shell which had been worked to form a small dishlike object may be evidence of trade with peoples from the Gulf Coast.

ALMAGRE PHASE

Excavated components of the Almagre Phase are Layers 5 to 7 of Tm c 315, Layer 3 of Tm c 314, and Layer 4 of Tm c 82. Artifacts from surface collections from Tm c 321, the west end of Tm c 305, Tm c 291, Tm c 175, Tm c 339, Tm c 300, and Tm c 179 reveal that these sites contain this same phase.

Some 541 artifacts belonging to from thirty-three to

possibly thirty-seven types define this phase. In many respects it is very like La Perra, and Layer 4 of Tm c 82 was not recognized as belonging to a different artifact complex until the abundant Almagre remains were uncovered at Tm c 314 and Tm c 315. These latter components revealed that there was another artifact complex with such distinctive traits as Almagre points, Gary points, Kent points, keeled end-scrapers, canine-shaped beads, and crude lamellar flakes. However, this phase has, in common with La Perra, square-based blades, mullers, Tortugas points, bird-bone awls, snail beads, and large disk choppers. There also occurred in the early part of the phase a few skin smoothers and battered nodules. In common with both Nogales and La Perra, though here they are rare traits, are Nogales and Abasolo points, mortars, pebble manos, spoke shavers, gouges, disk scrapers, and small chipped disks. Also included in the Almagre congeries are the general, undistinctive traits, such as choppers, ovoid blades, thick and thin side-scrapers, plano-convex end-scrapers, and pebble hammerstones, that we have met before.

Bone material associated with Almagre remains indicates a climate very similar to that of La Perra but perhaps a little drier. The reason for this conclusion is that, though tropical deer bones predominate, there is a slightly larger proportion of the white-tailed variety. Rabbit, peccary, and coatimondi also were found with Almagre remains.

Seasonal cave and camp occupations were most common, but two sites seem to be villages with wattle-and-daub houses. Only one temporary camp and one cave occupation were found. The dominant community pattern has been classified as semi-sedentary macro-bands. An increase over the previous horizon in agricultural activities may have contributed to the size and sedentariness of groupings, although in leaner months (evidenced by the two temporary occupations) micro-bands may have continued to separate off to hunt and forage. The villages (so designated by their wattle-and-daub remains) probably at this time had not yet achieved true permanence, for it seems likely that agriculture was still too limited to rely on, and the depletion of local resources by intensive food-collecting would have necessitated moving from time to time.

Comparison with La Perra (its ancestor) and with Flacco (its relative in southwest Tamaulipas) has enabled us to estimate the subsistence pattern of Almagre. It seems likely that 70 per cent of their food by volume was from collecting, 20 per cent from agriculture, and 10 per cent from animals. The mortars certainly indicate food-gathering, which is considered their dominant activity. The mullers and pebble manos may mean agriculture, though they also could have been used to grind wild foods. Deer and peccary may well have been killed by atlatl darts. These darts differed from those of La Perra in the way that some of the points were attached to the foreshafts. Many of the points of the Almagre horizon have stems, frequently with gum on them. A few of the points have notches. These points appear to have been inserted into slots in the foreshafts and stuck with gum and then the wood of the mainshaft and the stems of the points were string-wrapped. Rabbit and coatimondi were probably caught in traps. Burned bones were found, and scraped bones may mean that marrow was eaten.

Burials seem to have been treated in the same manner as those of La Perra. The two flexed burials with a few chipped artifacts were found in pits in the back of caves.

The industries of the Almagre people seem to have been extremely similar to those of La Perra and Nogales. Flint-knapping of bifaces and scrapers was probably the same. There, however, has been added one new technique: viz. the making of crude lamellar flakes or prismatic blades. In this process the Almagre people first selected a block of flint with a striking platform or end at an oblique angle to one of its sides. Then at the oblique angle junction of the striking platform a series of percussion blows, struck from above, removed long flakes from the side of the core. After a series of parallel ridges had been fashioned on the side of the core, a blow was struck from above on the top of the ridge between two flutings. In this way a long prismatic flake was removed. Many of these prismatic flakes show evidence of lateral retouching or wear. I suspect they may have served as some sort of side-scraper or fleshing knife.

The grinding of stone, wood-working, the working of bone, and the making of snail-shell beads were the same as in the La Perra horizon. Stone canine-shaped beads, however, are distinctive ornaments. Probably leather-working was similar. However, there was one difference in that the Almagre people used a keeled, roughly triangular end-scraper. The retouching at the end opposite the cutting edge leads me to believe that these end-scrapers were probably hafted.

There is some evidence of trade by the Almagre people. The Flacco point certainly indicates some sort of contact with the peoples of southwest Tamaulipas, while the Langtry Stemmed point may mean that the Almagre people were trading with those of the Big Bend area of Texas.

LAGUNA PHASE

The Laguna Phase, both in number of components and of artifacts, is the most common in the Sierra de Tamaulipas. Excavated components are Tm r 172, Tm r 88, Levels 4 through 7 of Tm r 86, and Layer 1 of Tm c 174. Tm r 194, Tm r 195, Tm r 196, Tm r 223, Tm r 302, Tm r 324, Tm r 301, Tm r 310, Tm r 262, Tm r 187, Tm r 338, Tm r 328, Tm r 185, Tm r 186 and Tm r 188, judging from ceramics collected from their surfaces, are components of this phase.

There are a host of new traits which are diagnostic of the Laguna Phase, such as Laguna Brown, Laguna

Orange, and Laguna Fine Cream pottery types, square-based celts, Panuco Coffee-Bean-eye figurines, Panuco Bulging-eye figurines, Panuco Type A figurines, Z-twisted cotton yarn, rectangular twilled mats, woven rings, and two-over-two twilled cotton cloth. Ceramics also reveal a number of special characteristics, such as solid vessel feet and basal ridges, as well as a number of distinctive vessel forms, such as thickened-lip bowls, thickened-lip ollas, bowls with basal ridges and vertical recurved-sided bowls. Besides these more specific traits, large valley villages with ceremonial plazas and boulder house-platforms are found only in this time period. There are also a number of traits that are more prevalent in this period but carry on into later periods. These include Eslabones Red and La Salta Black pottery types, Palmillas Corner-notched points, Ensor Side-notched points, Morhiss Stemmed points, fine lamellar flakes, bell-shaped pestles, bark-beaters, Panuco Type C figurines, clay beads, stone beads, clay ladles, rattles, effigy cups, clay flutes, perforated and unperforated clay disks, and the use of incising on pottery rather than engraving. Starting in this period but dominant at a later date are Pueblito Plain, Pueblito Brushed and La Salta Polished pottery types, Armadillo Stemmed points, Matamoros Triangular points, Catan Round-base points, pointed-base celts, finely-chipped triangular and ovoid bifaces, angled-back metates, cylindrical and rectangular manos. Also occurring in this horizon are the very general traits that run through most of the Sierra de Tamaulipas sequence: thin flaked side-scrapers, ovoid bifacial blades, pebble hammers, and mortars. Seemingly lasting into this horizon are Abasolo and Nogales points, Tortugas Triangular points, Gary Stemmed points, crude lamellar flakes, square-based bifacial blades, and choppers. A number of other traits occurred only in Layer 1 of Tm c 174. These may be materials that belong to the earlier La Perra horizon that got scuffed up into the Laguna level. However, they could be Laguna traits. They are large and small disk choppers, battered nodules, pebble manos and mullers, gouges, and large thick flake side-scrapers.

Laguna Phase components occurred not only in the Sierra de Tamaulipas but also in the more level land just to the south and west of these mountains. So their established range at present is in both the arid mountains and the more humid lowlands. We have some evidence concerning the climate at the time of this phase in the Sierra de Tamaulipas. From Level 1 of Tm c 174 we have considerable vegetable material. This material contains yucca, a plant of arid country along with *manioc*, *Lonchocarpus*, and *Froechlichia* (tropical plants). Bones of both the tropical deer and the white-tailed deer occurred, but those of the white-tailed deer were slightly more prevalent than the tropical one. These suggest that the climate during Laguna times was a little drier than during the Almagre horizon but not so dry as at present. The complex of plants and animals would seem to indicate that the Sierra de Tamaulipas at this time period was in the Arid Upper Tropical Biotic sub-zone, which at present is south of the Sierra de Tamaulipas.

The sites of this phase are radically different from those of the earlier horizons. There are very few seasonal or temporary occupations. Most of the sites are villages that range from two or three house-platforms to three or four hundred. These villages most often are situated on the tops of hills in fairly defensible positions, but nearly as many are placed in indefensible valleys. The central part of each village usually has a plaza with temple-platforms surrounding it. The house-platforms are around this central plaza in no regular manner as far as we were able to determine.

The temple platforms are most often truncated cones, but a few are truncated pyramids. They range from ten to forty feet in height. Although only a few of them have steps leading to their summits, I suspect all had them originally. From the walls of pits dug by various looting treasure-hunters temple platforms appear to have centres composed of dirt and flat slabs laid in no regular pattern. Their exteriors have slab masonry, and one from Tm r 304 had painted plaster over the masonry. Originally this may have been common to all of them. Wattle-and-daub on the surfaces of the platforms revealed that small thatched-roof mud-walled temples surmounted them. From the circular outline of the top of many of these mounds, I would suppose that the houses were round or oblong in outline, and that some were of considerable size.

The plazas were flat areas, and I suspect many of them on the hilltops were levelled. Occasionally one portion of some of them had a terrace to extend the plaza. There was a tendency for one mound on one side (often the north) of the plaza to be much larger than all the others. In orientation, at least four of these plazas (measured when I happened to have a compass with me) were found to be oriented along the cardinal axis. This may indicate some knowledge of astronomy.

More prevalent than the temple platforms were the house-platforms. All of these were circular in outline. In the Laguna Phase, many of these house-platforms were outlined by a series of boulders, and the area inside the boulders was filled with dirt. There usually were no steps leading to their summits. A few had masonry walls made of slabs of rock. These were usually a little higher in elevation than those made from boulders and for the most part had steps leading from the ground to the summit. There was good evidence that houses of wattle-and-daub with thatched roofs, and probably ovoid in floor plan, topped the platforms. In a few of the sites, areas between house-platforms along the sides of hills had been terraced, and one site had a rectangular area paved with slabs of stone. A few sites had large depressions in them, called *tanques*. These were undoubtedly reservoirs for water. None of these earlier ones show evidence of having been artificially con-

structed or improved, and they seem to bear no sort of planned relationship to the rest of the site.

The planning of the villages, the construction of the temples, and other architectural features would seem to indicate that there were some persons invested with time, power, and authority to direct these operations. Since the larger edifices are obviously ceremonial in nature, it is most likely that this body was some sort of organized priesthood. We may surmise that, at this time period, there was at least the beginnings of a class system with the priestly group, probably full-time specialists, occupying positions superior to most of the people, who were probably farmers, some of them perhaps part-time craft specialists.

The general community pattern has been classified as one of sedentary temple-oriented groups. Such large, permanent settlements were made possible by improved agricultural production. Analysis of food remains from Layer 1 of Tm c 174 revealed that, by volume, 42 per cent of their diet was from agricultural plants, 50 per cent from wild plants, and 8 per cent from animals.

The food remains from Tm c 174 reveal that these people were basically agriculturists. Their dominant crop was maize belonging to three (or five) races: Nal-tel (and possibly Primitive Nal-tel A and B), Dzit-Bacal, and Breve de Padilla. These three new races show evidence of *teocentli* introgression. It rather appears that the first two types were developed in distinct areas and then introduced into the Sierra de Tamaulipas rather than hybridized *in situ*. Breve de Padilla probably came out of southwest Tamaulipas where it is found archaeologically along with actual grains of *teocentli*. Some of the Nal-tel corn is charred; popcorn probably was eaten. The profusion of manos and metates in conjunction with evidence of shelled cobs in Laguna components reveals that much of it was ground into meal; probably foods similar to *atole*, *tortillas*, and other surviving indigenous Mexican dishes were prepared. Some of the cobs of corn show evidence that the kernels had been cut off while green. These were perhaps used to make some sort of soup (or beverage).

One common bean and one manioc seed represent other domesticated foods that were probably prepared for eating by boiling. The other major domesticated plants were *Cucurbita*. There are a number of seeds, shells, and stems of *Cucurbita pepo*, which were probably eaten raw or after drying. Wild *Cucurbita* also was present, and the seeds of it were probably eaten. A fragment of gourd (*Lageneria*) rind occurred. The seeds of this gourd may have been eaten or the gourd used as a container.

The molcajetes and pestles suggest the cultivation and grinding of some sort of *chili*. Judging from the refuse in Tm c 174, wild plant foods were still consumed in great quantities. They were collected and treated in much the same way as they had been in the La Perra horizon. A few bones indicate that a small amount of hunting was still undertaken. Deer, jaguar, peccary, and perhaps turkey, were killed by darts and possibly arrows. The tips probably were hafted to a foreshaft and stuck with gum, and the foreshaft and the stem or base of the points were wrapped round with string.

At Tm c 187 one plaza area definitely served as a cemetery. The burials in this cemetery were all of the bundle type; i.e., the bodies of the deceased had been left exposed until the flesh had been removed and then the bones were bundled and placed in the cemetery. Most of the bones were placed in or under pots, and it is evident that a number of individuals were buried at the same time. The general impression is gained, especially from the last practice, of considerable organization and formalization of activities around death.

With the efflorescence of other industries in this horizon flint-knapping becomes relatively less important in the total technical complex. A few bifacial blades and scrapers were made in a manner similar to those of the pre-pottery horizons. Spear points were similarly made, but almost all of them (Gary, Ensor, Palmillas, and Morhiss types) are notched or have stems. They were probably hafted in the manner that was initiated in the Almagre period, that is, string was passed through the notches or around the stems to hold them to the foreshafts. A single atlatl mainshaft fragment occurred in Layer 1 of Tm c 174, so it seems possible that these larger points were the tips of atlatl darts. However, in this period two smaller projectile point types begin to appear—Catan and Matamoros Triangular. These were probably hafted like their ancestral types, Abasolo Round-base and Tortugas Triangular. Their small size and the fact that an arrowshaft occurred in Layer 1 of Tm c 174 suggests that Catan and Matamoros points were the tips of arrows. After some of the large ovoid and square-based bifacial blades had been initially chipped by pressure flaking and their edges retouched, they were then more finely finished by pressure flaking over both their surfaces. Crude lamellar flakes, struck from prepared cores with a striking platform at an oblique angle to the fluted sides, were still made. However, the majority of the prismatic blades of this time period were of obsidian and some of them were struck from cylindrical fluted cores with a striking platform at right angles to the side. Such blades may have been inserted into slots in handles or clubs for use as knives or weapons of war.

Almost as important as working stone by chipping was the working of stone by grinding. Although the mortars still continued to be made by pecking, most of them were finished by grinding or polishing. Besides mortars, the Laguna people ground out pointed and square-base celts or adzes, pestles, rectangular and cylindrical manos, angled-back metates, and bark-beaters.

We have no evidence that bone or shell tools were made. The only tools showing wood-working were a few pointed sticks with whittled ends. However, there were a number of indications that the wood-working complex was probably fairly large. The celts were

probably hafted like axes, the adzes hafted like mattocks and used for felling saplings and trees, from which may have been built pole-walled, daubed houses such as are made in the area today. The projectile points, bifacial blades, and lamellar flakes were set into wooden handles or shafts.

From the lack of scrapers it would seem that leatherworking was of minor importance. One piece of deer fur was found. It is likely that cotton textiles or textiles from other fibres had largely replaced leather goods. A few stone bark-beaters occurred, and bark cloth might have been used. We found none in excavation, however, and it may be that the so-called bark-beaters were used for grinding food, not for working bark cloth.

From Layer 1 of Tm c 174 we learned a little about the textiles of the Laguna people. Like La Perra, there are many strands of yucca. These strands bear square, granny, and overhand knots, either to make carrying strings or to tie pieces of yucca together. However, more abundant than strands were pieces of twisted string, of which there are two main varieties. One was made from maguey fibres without the use of a spindle whorl. This string has S-twisted yarn, and single, double, or triple Z-twisted yarn cord, probably made in the same manner as the string of the La Perra horizon. As common as this primitive string, however, is cotton yarn. All of this is Z-twisted and was undoubtedly made with a spindle whorl. The perforated clay disk may very well have been part of this spindle whorl. Some of this cotton fibre was woven on a loom into a twilled cotton cloth featuring two string wefts with a double strand woven through them. The end of the selvage was tied with an overhand knot. Fabrics made in this manner may have served as clothing or as blankets. Besides the weaving of cloth, the Laguna people made twilled rectangular mats from palm leaves. Some of these mats were laid on nests of leaves to serve as bedding. One woven ring of roots may have been some sort of arm-band or bracelet.

The industry for which we have most evidence is ceramics. Into the clay, temper of limestone was kneaded for the cruder vessels, or fine grit for the finer ones. Microscopic examination of the larger ollas indicates they were made by the coil method. However, even with microscopic examination of cross-section I was not able to discern coil breaks in the bowls. Perhaps they were modelled in the round or had various sections attached one to the other. Once the vessels had been shaped they were either slipped, brushed, or smoothed. Some then had small solid conical feet attached to them; a very few had loop handles, and some of the brushed ware had stirrup handles. The interiors of a few of the bowls were incised while the clay was wet. Next they were fired. As some of the earlier types, such as Laguna Fine Cream, Laguna Orange, and Laguna Brown, are extremely hard, they may have been fired in some sort of special kiln with an artificial draft. However, excavation uncovered no kilns. The other pottery, most of which is fairly soft, was probably fired in some sort of open bonfire. Once the pots had been fired, some of them were painted red or black; others were polished. The pots had a number of different uses. The ollas may have been used for carrying water and storage. A very few of them, mainly Pueblito Brushed, may have been used for cooking. The bowls with incised interiors may have been used for grinding chili. The various bowls and plates may have been used for storage, serving food, and for decoration. Generally speaking, the pottery types fall into two general classes: utilitarian ones without decoration such as Pueblito Plain and Pueblito Brushed, and decorated ones such as Eslabones Red, La Salta Black, and Laguna Fine Cream.

Besides vessels, figurines were made from clay, most of which is well-knit without much, if any, tempering materials in it. These seem to have been modelled by hand, gingerbread style; i.e., the body, head, and limbs were made separately and then molded together. Particularly distinctive of these figurines is the making of the eyes, which are either made by twice punctating appliqués of clay or by making two incisions with a dot in between them. Noses are a mere triangular blob of clay, and lips two parallel elongate appliqués. Bodies of the figurines are all female, and their sexual features are well marked. Perhaps these figurines represented fertility concepts or deities.

The figurines also reveal a number of features concerning the garb and ornaments of the Laguna people. All figurines have large doughnut-shaped ear-plugs. Nose-plugs occurred on a couple of figurines, and arm bands, belts, and wristlets are common. Headdresses are either conical turbans or some sort of fezlike cylindrical hat. Hanging down from the belt of one figurine was a loincloth or diaper, while one necklace held a cape hanging down the wearer's back. No actual articles of clothing, however, were found in our excavations. Figurines also show necklaces of spherical beads. In excavation we found both clay and stone spherical beads.

Clay flutes and rattles are all we have of the musical instruments of the Laguna people.

There is considerable evidence of widespread trade. El Prisco Black was imported from the Huasteca; obsidian, jade for beads, and greenstone for celts were imported from the south. Shells were imported from the Gulf of Mexico. The flint found in Laguna sites is varied and certainly came from a number of different sources. Furthermore, the various types of maize must originally have been imported from the Huasteca.

ESLABONES PHASE

Excavated Eslabones components are Tm r 6, Levels 3 and 4 of Tm r 79, Levels 1 to 3 of Tm r 86, Layer 2 of Tm c 81, and Layer 3 of Tm c 82. Surface collections from Tm r 311a, 337 and 304, on the basis of

their pottery types and special ceramic features, are considered to be components of this phase.

The Eslabones Phase in reality is a transition from Laguna to La Salta, each of which has a number of very distinctive traits. The only Eslabones traits that are radically different from those in other periods are the portrait effigy and rectangular headdress mold-made figurines, a ball court, and *tanques* dammed by masonry. A number of traits dominate this period, though they occurred in minor amounts in other periods. These are Morhiss Stemmed points, ruins with paved areas and terraces, large hilltop ruins, La Salta Black type pottery, and pottery with nubbin feet. Lasting into this period but dominant earlier are Gary Stemmed points, stone and clay beads, clay rattles, clay flutes, Abasolo, Nogales and Tortugas projectile points, Panuco A and C figurine types, Eslabones Red pottery type, and clay bowls with incising on the interior and with solid conical feet. Occurring in this period but dominant at a later time are Matamoros, Catan, and Armadillo projectile points, pointed lamellar flakes, mold-made figurines with triangular heads, bowls with hollow feet, and engraved decoration on the exterior rims of pottery vessels. In common with other ceramic sites are Palmillas and Ensor projectile points, crude and fine lamellar flakes, pointed-base celts, fine ovoid and triangular biface blades, bell-shaped pestles, angled-back metates, cylindrical and rectangular manos, bark-beaters, pierced and unpierced clay disks, effigy cups, ladles, Pueblito Brushed and Plain pottery types, truncated pyramids and cone temple-platforms around plazas, masonry house-platforms, and an agricultural economy. There are also, of course, the very general traits such as thick and thin side-scrapers, crude ovoid bifacial blades, pebble hammerstones, mortars, and pebble manos. Occurring in only one of the levels of the caves was a series of tools which are probably intrusive from earlier horizons. These include large plano-convex end-scrapers, gouges, disk scrapers, choppers, large and small chipped disks, battered nodules, and mullers.

On the basis of a meagre sample of bones, we have concluded that the climate was similar to that of Laguna times. Since Eslabones is so closely related to Laguna and to Palmillas of the Sierra Madre, and since they have about the same proportions and types of metates, manos, molcajetes, mortars, and projectile points, it is likely that the Eslabones subsistence was also based on corn agriculture supplemented by some food-gathering and a very little hunting.

It was during the Eslabones Phase that the population of the Sierra de Tamaulipas reached its maximum concentration. Although we did find evidence of some cave occupations, all the open sites were large (up to 1,000 house-platforms). Our sample was small, but all sites found were on defensible hilltops with a large neatly-arranged central plaza surrounded by pyramids. One side of the central plaza always had one pyramid larger than all the rest. Besides the main plaza with its pyramids there were other smaller plazas without any main pyramid and a few pyramids with no discernible plaza area. Not far from the plaza area there was always a *tanque*. One each at Tm r 6 and Tm r 304, and possibly a third at Tm r 86, had masonry construction along one portion of the *tanque*. This construction may have been for the purpose of damming up the depression. Near some of the pyramids were areas containing large numbers of flat slabs of limestone. Though we never cleared any of these areas, it looked as if there were some sort of pavement. A ball court with an oval playing field occurred at Tm r 304. The house-platforms were in no regular pattern, but those along the slopes of the hill were inclined to be arranged so that a series of them were about the same contour level. Sometimes they were terraced with a wall leading from one platform to the next. There may also have been another series at a higher or lower contour level. Round wattle-and-daub houses were usually set on platforms made from slab-masonry, with steps leading from the ground to their surface.

At this time period there is the greatest evidence of centralized authority in town planning. Since the best planned pattern of the cities were the plaza and temple areas, it would seem that the authority was in the hands of some sort of priesthood.

No burials were found, but Pedro Lerma informed me that bones had been found inside pots at Tm r 86 and showed me an area where a treasure-hunter had been digging. On the dirt piles of this excavation were numerous human bones and fragments of large vessels. It therefore seems probable that the burial customs during Eslabones times were similar to those of the Laguna Phase.

Flint-knapping and the grinding of stone were done in the same manner as in Laguna times, and the types of artifacts were even the same. No bone or shell of this horizon was found. Celts indicate that there was probably some wood-working, and pierced potsherd disks, which may have been spindle whorls, suggest that textiles were still being made. The few scrapers found may mean that a little leather was worked. However, like Laguna, the Eslabones people had very few scrapers in comparison with their other artifacts, and again I suspect that cotton textiles had largely replaced leather goods.

The technique of pottery manufacture was about the same as in Laguna times, except that there were none of the finer wares indicative of a special type of firing. There were, however, minor differences in decoration in that engraving on the exterior of vessels was almost as important as incising on the interiors. Vessel forms also differed. Molcajetes had three types of feet: large, conical, and solid; small, conical, and solid; and large, conical, and hollow. Hemispherical bowls were now much more important than the incurved rim bowl, and carinated bowls and plates had pretty much replaced bowls with basal ridges and vertical-

sided recurved bowls. The black ware reached its dominance in this period, but, generally speaking, decorated wares were fewer than in the previous period.

One of the most noticeable differences was the making of figurines. Two were found that were manufactured by modelling, as in the Laguna period, but most of them were mold-made. There were four kinds of these mold-made figurines: large Portrait type, one effigy "tigre," a large number with rectangular headdresses, and one with a triangular headdress. While these heads were made in molds, the bodies still seem to have been modelled "gingerbread" style. Like the previous period, the figurine arms had bracelets and arm bands, and some of the bodies had necklaces and belts. However, none had capes or loincloths. All figurine heads had large ear-plugs. Another interesting point is that some of these figurine bodies are obviously males, and most of them do not have breasts. It appears that there was some sort of change from Laguna times in the types of deities the Eslabones people worshipped.

Of considerable significance is the ball court at Tm r 304. Ball games in courts of this sort had ceremonial and religious implications in much of Middle America.

Commercial activities are indicated by the greenstone celts, the jade beads, and the obsidian side-notched points, which must have been traded into this area from the south.

LA SALTA PHASE

La Salta is less well known than the two previous phases. The house-platforms excavated at Tm r 78, the top layers of a house-platform at Tm r 79, and Layer 2 of Tm c 314 were the only excavated components. From the surface of Tm c 289, Tm r 322, Tm c 323, Tm c 80, and Tm r 90 sherds, which can be classified into the La Salta Phase, were collected.

Mold-made figurines with a triangular headdress, carinated bowls with short vertical rims having engraving on their exteriors, small-mouthed ollas with vertical necks, *caracol* structures, and pyramids with staircases flanked by pilasters are the only diagnostic traits.

Dominant in this period are Armadillo Stemmed projectile points, Pueblito Plain pottery, hollow vessel feet, and engraving. All of these are also found in earlier phases. Lasting into this period from the earlier ceramic phases are the La Salta Black pottery type, Pueblito Brushed and La Salta Polished, Ensor Side-notched points, Palmillas Corner-notched points, Morhiss Stemmed points, crude and fine lamellar flakes, pointed-based celts, perforated and unperforated clay disks, cylindrical and rectangular manos, and angle-backed metates. Also carrying-over are the more general ceramic features, house-platforms, truncated pyramids, and truncated cones around plaza areas. Such general traits as Nogales and Tortugas points, ovoid blades, pebble hammerstones, and possibly, keeled end-scrapers, Gary Stemmed points, large flake side-scrapers, and large plano-convex end-scrapers also are present.

As in previous horizon some bones of the *Mazama* deer along with many more of white-tailed deer and those of peccary and rabbits were found. These bones seem to indicate that the climate was not radically different from that of Eslabones: dry but still more humid than at present.

The evidence, including numerous fragments of manos and metates, continues to point to a predominantly agricultural economy. However, mortars and projectile points would indicate some food-gathering and hunting.

The settlement remains show some changes from those of the previous ceramic periods. Many of the villages were situated on defensible hilltops but differed from earlier ones in size, as they were not so large, and in that temples did not surround the plaza areas. Furthermore, house-platforms were relatively rare and at one site do not occur, though considerable amounts of wattle-and-daub are present. The mode of construction of the temples and the house-platforms was much the same as in the previous period. However, the stairways of the temples differed in that on either side of them were pilasters, composed of large, flat, rectangular slabs of limestone. One temple from Tm r 78 had a divided staircase. Though many of the mounds were in a bad state of repair, there seemed to be a higher proportion of truncated pyramids than of the truncated cone variety. One obvious new feature was the single *caracol* structure at Tm r 78. Encircling this structure were stairs leading to its summit. Its exterior was composed of neatly fitted slabs of limestone, while its interior was filled with irregular blocks of rock.

Burials have not been found.

The kinds of settlements and architecture suggest that there had been changes in the society since Eslabones times. Certainly the population concentration was very much smaller. The decrease in the number of temples and the absence of plaza areas point to a decline in priestly and/or political authority. The fact that houses seem often to have been constructed without underlying platforms furthers the impression that the La Salta people had less time and energy to spend on non-utilitarian aspects of life.

Flint-knapping and the grinding of stone were the same as in the Eslabones Period. The only evidence we have of wood-working are the polished celts, and of leather-working, a relatively few scrapers. The only evidence for textile manufacture are potsherd disks (spindle whorls).

Ceramics was still a major industry. Four types of pottery were made: La Salta Black, La Salta Polished, Pueblito Plain, and Pueblito Brushed. These seem to have been made in much the same manner as in the previous horizons. However, it must be noted that the variety of types at this time period was limited. Perhaps the most outstanding characteristic of the La Salta Phase was the decorating of the exterior rims of vessels by cutting designs through their fired, polished surfaces.

Some of the vessel forms present in the La Salta Phase, such as carinated vessels and angle-necked ollas, continued from the Eslabones Phase, but none of the specialized types of Laguna which continued into Eslabones such as basal-ridged bowls, incurved rim molcajetes, thickened-lip ollas and the like, were present in this phase. Replacing these earlier forms are hemispherical molcajetes with hollow vessel feet, carinated bowls with short vertical rims, and small-mouthed ollas with short vertical necks. Comparing proportions of decorated and undecorated vessels, we find that in the La Salta the undecorated ones were preponderant.

Figurine heads and body fragments were very scarce. One head was triangular in outline and mold-made. The bodies were still gingerbread-made style, but many of them lacked belts or necklaces, and only a few had arm bands. The figurine heads, however, all had ear-plugs.

Zaquil Red sherds and the Zaquil Engraved sherds were definitely traded into the area from the Zaquil Period (IV) peoples of the Panuco-Tampico region. Obsidian and greenstone for celts also seem to have arrived from the south.

LOS ANGELES PHASE

Layers 1 and 2 of Tm c 82, Layer 1 of Tm c 81, and Layer 1 of Tm c 314 were excavated Los Angeles components from caves, while Tm c 83 was an excavated open site. In the survey, small Los Angeles sites were extremely numerous and were usually characterized by a few Los Angeles sherds. These unexcavated sites from which we collected pottery were Tm c 312, Tm c 220, Tm c 84, Tm c 85, Tm c 197, Tm c 198, Tm c 221, Tm c 222, Tm c 288, Tm c 290, Tm c 292, Tm c 294, Tm c 311, Tm c 316, Tm c 320, Tm c 325, Tm c 326, Tm c 327, Tm c 293, Tm c 308 and Tm c 338.

The Los Angeles Phase has a number of diagnostic traits which set it apart from previous horizons. They include Fresnos points, Starr points, Diablo points, Los Angeles points, Pasitas points, flake end-scrapers, rectangular metates, whetstones, incised bone, bar shell pendants, copper ear-spools, tubular bone disk beads, two-yarn S-twisted cotton, split-stitch basketry, cane flutes, cane cigarette butts, pierced gourds, pierced leather, a nut on a stick, clay pipe stems, jack beans, Los Angeles Plain, Los Angeles Brushed, and Los Angeles Black pottery types, as well as the stick figure-type pictographs. Dominant in the Los Angeles horizon, but beginning earlier, were Armadillo, Catan, and Matamoros points, pointed lamellar flakes, fine triangular and ovoid bifacial blades, rectangular manos, arrows, Breve de Padilla race of corn, and small villages on terraces in valleys. Lasting into the Los Angeles Phase, but dominant earlier, were Abasolo points, Nogales points, Tortugas points, Palmillas points, Ensor points, Morhiss points, fine and crude lamellar flakes, square-based blades, bell-shaped pestles, cylindrical manos, angled-back metates, twilled mats, and the common bean, squash, and gourd. More general traits also occurred and include two-yarn Z-twisted maguey cord, square knots, granny knots, and overhand knots, spoke shavers, thick and thin flake side-scrapers, large plano-convex end-scrapers, small chipped disks, pebble hammerstones, choppers, ovoid blades, mortars, and bird-bone awls. A number of other traits also occurred at one or more Los Angeles components, but these may not have been made by the Los Angeles people and possibly were dug up by them from earlier levels or received in trade. These include Almagre and Gary Stemmed points, mullers, pebble manos, keeled end-scrapers, skin smoothers, gouges, snub-nosed and stemmed end-scrapers, battered nodules, large chipped disks, shell disk and tubular beads, Cameron points, Hayes points, San Fernando points, a copper ear-spool, a spindle whorl, and Huasteca (VI) sherds.

The animal bones, with white-tailed deer bones in predominance, and the floral remains, with numerous examples of yucca, cactus, *opuntia*, and *sabal*, reveal that during this phase the climate was probably nearly as it is today. This would mean that little rainfall occurred throughout most of the year with a few torrential showers in the late spring and autumn.

The subsistence complex was well adapted to this sort of climate, for the Los Angeles people made extensive use of the Breve de Padilla race of corn. This corn is a hardy race that will grow under rather dry conditions and needs only a few brief showers just before it is ready to harvest. Saldivar records that the Pasitas tribe, who may be connected with the Los Angeles Phase, made tortillas. However, some of the Los Angeles corn was undoubtedly boiled, as many of the pots contained carbon adhering to their interiors. Both the common beans, jack beans, and squash may also have been boiled. Though these Los Angeles people were basically agriculturists, they did considerable hunting and snaring, for bones of a wide variety of animals were numerous in Los Angeles layers. Horses, white-tailed deer, peccary, and jaguar were undoubtedly killed by arrows or atlatl darts. Small wood foreshaft fragments and mainshaft fragments, as well as the many small points, indicate that the bow-and-arrow was the dominant weapon. They may also have used arrows to kill turkeys and birds. Rabbits, rodents, coatimondi, and some birds may have been caught in snares or traps. Burned and cracked bones were found, the latter probably yielding marrow. Plant-collecting was of slightly less importance. Major plants collected were nuts, *ébano* seeds, *agave* leaves, and opuntia stems.

The majority of sites in this phase were found in caves and were perhaps seasonal. Almost as numerous were small open sites on the high terrace and valley bottoms, often near springs. Wattle-and-daub and burned clay were numerous on these latter sites. I consider them to have been small, semi-permanent villages composed of a few wattle-and-daub houses, but

without religious structures or evidence of any sort of community planning. These villages correspond quite closely to those described by Saldivar for the tribes of the Sierra de Tamaulipas at the time of the Conquest. He mentions that there was often a hunting or war chief and that these villages had recognizable territories.

Burials were either bundle or flexed and were accompanied by a few ornaments. The few burials we found did not indicate that there were cemeteries or that much ceremonialism was connected with the disposition of the dead.

The industries of the Los Angeles people are well represented archaeologically. Flint-knapping was once again a dominant activity. The knapping of flint was slightly different from that of the previous period, in that initially a thin flake of flint was selected. This thin flake was then manufactured into final form mainly by pressure flaking; little evidence exists of extensive use of the percussion technique. Occasionally these thin flakes were struck from special cylindrical polyhedral cores. Later the lamellar flake was retouched into its final form. Rectangular metates and manos were made by grinding, as well as by cylindrical mortars and pestles. Bone awls and beads were also fashioned into shape by grinding. However, this technique is nowhere as important as it was in the three previous horizons. The disk shell beads were made in the same manner as in Nogales times; i.e., first a blank was made by polishing, and then it was sawed into thin sections through which holes were drilled.

Many fragments of whittled wood tools and cut cane were recovered. Spoke shavers and flint flakes must have been the tools used in shaping these wooden objects. Sticks were made into pegs, pointed objects, arrow foreshafts, and probably bows. Cane was usually sawed into lengths and was used for cigarettes, flutes, arrow mainshafts, and possibly beads. Often after the wood had been whittled into shape, it was ground smooth. The post-molds from Tm c 83 showed that relatively large poles were used for building round houses. With just what tool the people filled the trees is not known; perhaps some of the crude choppers could have served, or perhaps they burned them down.

Some evidence of the manufacture of textiles was found. Twilled mats were woven from palm leaves. Since these rectangular mats appeared in beds of leaves in Tm c 314, I believe they served as part of the bedding. The presence of the spindle whorl and cotton string would seem to mean they probably wove cotton cloth, but unfortunately our excavations revealed not a scrap of it. One extremely small fragment of coiled basketry was uncovered. The coils were composed of bundles of grass, stitched together from left to right by yucca strands that were split and woven, one through the other, as well as through the bundles.

In our excavations in Tm c 314, one fragment of leather with four holes along its edge was uncovered. It had been scraped clean on both sides and cured. I suspect that the flake end-scrapers hafted in sticks had been used to prepare this skin. A bone awl was probably used to punch the holes along the edge. Though this is only a small scrap of leather, I think that it is probably part of a *huarache*, for one side is worn and cut as if it had rubbed against the surface of the ground, while the other side is polished and black (from rubbing against someone's dirty foot?).

Shell disk beads, bone disk beads, and bone tubular beads were strung to form necklaces. In the region of the neck and chest of the flexed burial in Tm c 82, were a large number of these beads. One other ornament was a copper ear-spool, which probably was traded in from some outside area.

An important industry, though not so important as in the previous three phases, was pottery making. Local clay was used to make the pottery, but it was poorly kneaded together. Next, small fragments of crushed limestone or white stone were mixed with the pottery as temper. Then ollas and bowls were made by the coil method. Once the pots were completed, their surfaces were either smoothed or brushed with a handful of grass. They were then fired. The lack of hardness of the Los Angeles pots would seem to indicate that they were merely placed in and around a large bonfire. Upon the completion of firing, a few pots had carbon rubbed into their exterior surfaces to give them a shiny black surface. All the pottery of the Los Angeles Phase is without decoration, and three pottery types, viz., Los Angeles Black, Los Angeles Brushed, and Los Angeles Plain, are extremely similar. Ollas were undoubtedly used for storage and for carrying water, and since many sherds of these vessels have carbon adhering to their interiors, it is probable that food was cooked in them. Bowls also show evidence of being used for cooking. The brushed and smoothed surfaces of the pots, as well as some of the vessel forms, may indicate that this is the end-product of the ceramic tradition that includes the pottery of the Laguna, Eslabones, and La Salta Phases. If this is true, then this pottery is definitely a degeneration of the earlier tradition, for it is more poorly made, more poorly fired, undecorated, and has only a limited number of vessel forms. There is one other object made from clay, namely, a pipe stem fragment. Unfortunately we do not have the whole bowl to tell us just what type it is, though I would guess it is probably of the elbow variety.

Smoking was more commonly done in cane cigarettes. Here tobacco was stuffed inside hollow tubes of cane and one end lit, the cane and the tobacco burning as it was puffed. Whether smoking had ceremonial significance we do not know, but the relative abundance of cigarette butts in the cave Tm c 314 and the relative abundance of cigarette butts in similar cultures in southwestern Tamaulipas would seem to indicate that a good deal of smoking was done for pleasure.

There is considerable evidence of trade during Los Angeles times. There are a host of Huasteca pottery

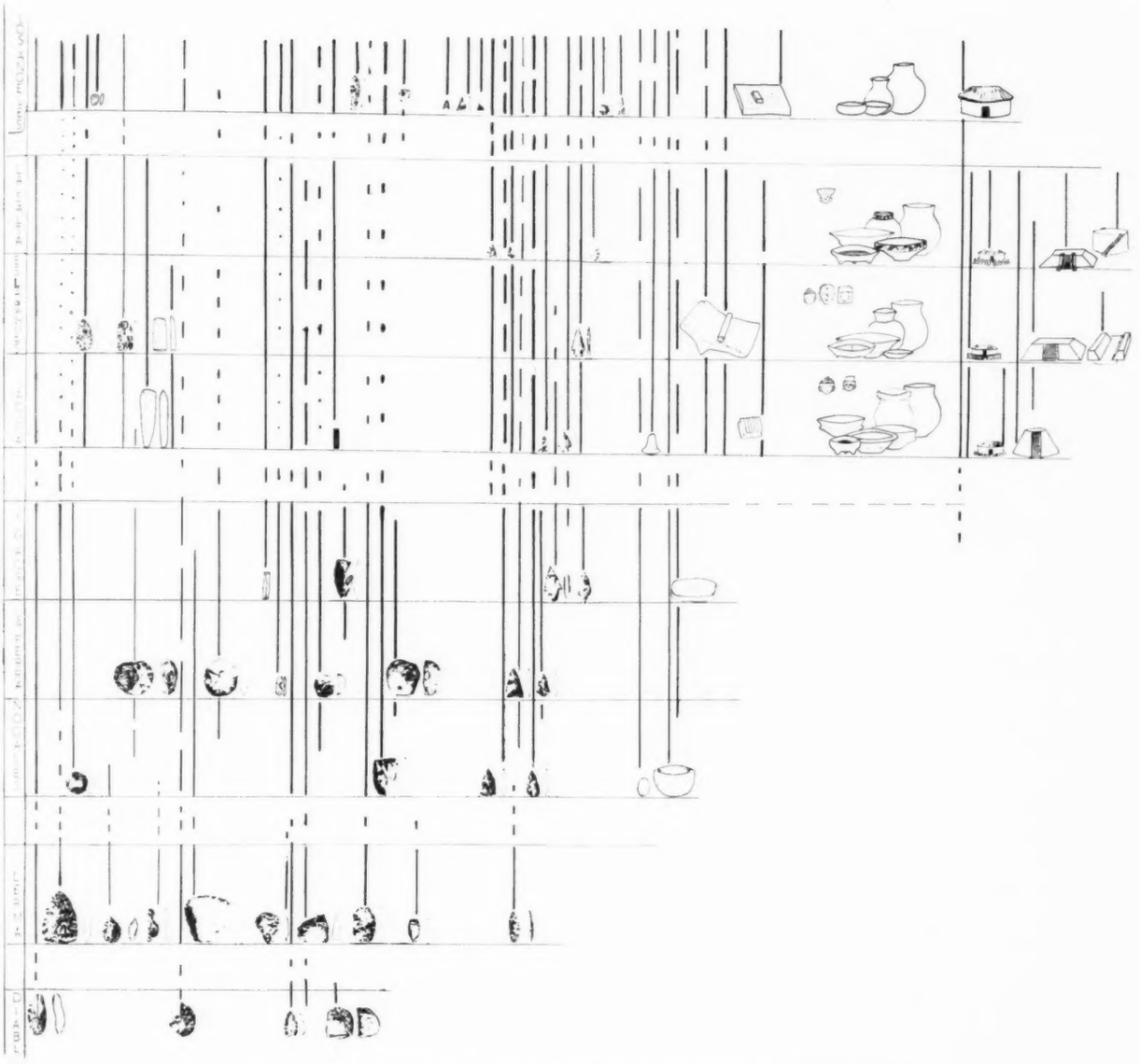


FIG. 49. The diagnostic artifacts of cultures of the Sierra de Tamaulipas.

types, probably from the Tampico–Panuco area of the Panuco (VI) Period, and a spindle whorl, probably from the same area. The obsidian must have come from the south, and the shell beads and shell bar beads probably came from the area of the Rio Grande Delta. Especially interesting is the single sherd of Fatherland-Leland Incised from the central Mississippi Valley. In spite of Los Angeles people's numerous contacts with fairly sophisticated peoples, their local manufacturers seem to have benefited very little. One cannot help but think that the exigencies of living in an inhospitable, increasingly arid environment held these people back, even though they were in contact with numerous other groups.

2. COMPARISONS

In this section, first the various complexes of the sequence of the Sierra de Tamaulipas are compared one with the other. Then the complexes of the Sierra de Tamaulipas are considered in light of those from southwest Tamaulipas. Then a comparison is made with the Huasteca. Finally, there are comparisons with northern Tamaulipas and those cultures in the adjacent parts of Texas. These comparisons are limited, for several reasons. In the immediate areas around Tamaulipas there are no comparable phases for comparison with much of the Tamaulipas sequence. For example, in the Huasteca the pottery periods are somewhat comparable to

those from the Sierra de Tamaulipas, but no pre-pottery manifestations are known. Farther south into Meso-America there are still no pre-pottery phases for comparison, and the pottery horizons reveal less and less resemblance as one goes farther and farther away. Northward into Texas, almost the reverse is true. There are some pre-pottery manifestations like those from Tamaulipas, but there are no phases with similar ceramics. Another practical reason for not making wider comparisons is that as yet the areas nearest to Tamaulipas, and probably the most comparable, have not been fully reported in print. Such areas would be Coahuila, the Big Bend area, San Luis Potosí, and south central Texas. Finally, this report is too long already.

INTERNAL COMPARISONS

In our first comparisons, between the cultural phases of the sequence of the Sierra de Tamaulipas, the main purpose is to see continuities and discontinuities in this area.

The earliest culture, Diablo, is of such a generalized nature that most of its artifacts are similar to those in later horizons. The crude side-scrapers, the choppers, and the bifacial blades run through almost the whole sequence. No conclusions can be reached on the basis of comparisons with Diablo because our sample is too limited.

Starting with Lerma, however, we do have a sufficient sample of tools to justify certain tentative conclusions based upon comparisons. Of the fourteen types of artifacts of this horizon, six carry on into the Nogales horizon. These are square-based blades, choppers, ovoid bifacial blades, thick flake side-scrapers, pebble hammerstones, and plano-convex end-scrapers. The other types do not continue. This would seem to indicate that as yet there is no evidence, in the Sierra de Tamaulipas, of cultural continuity from Lerma to the Nogales Phase. This may be interpreted in two ways. Either there is a considerable time gap between the two and the necessary cultural transitional phase has not been uncovered, or the Lerma Phase represents the material remains of one group who were replaced by the Nogales peoples of a different cultural tradition. Evidence from southwest Tamaulipas suggests that the first interpretation is the correct one.

The Nogales Phase has twenty-nine different artifact types. All but four of these last into La Perra times. Certainly this indicates cultural continuity between the two. In fact, some of my colleagues have objected to separating Nogales, La Perra, and Almagre into separate phases. However, the significantly different percentages of gouges, small chipped disks, mortars, and Abasolo Round-base and Nogales Triangular projectile points, as well as the absence of certain traits of the La Perra horizon, justify viewing Nogales as a distinctive cultural complex. Nogales does, however, begin a tradition that lasts for a considerable length of time without many great cultural changes.

La Perra has all the traits of the Nogales Phase. It has few new traits such as Almagre points, skin smoothers, and battered nodules. Moreover, it has certain traits—manifested in its preserved vegetal remains—that are not directly comparable with the preceding or succeeding phase. This horizon has in common with Almagre such traits as pebble manos, mortars, small chipped disks, gouges, spoke shavers, disk scrapers, Abasolo Round-base, Tortugas Triangular, Nogales Triangular, and Almagre Stemmed points, snail-shell beads, square-based blades, mullers, choppers, ovoid blades, thick and thin Flake side-scrapers, plano-convex end-scrapers, and pebble hammerstones. This is an impressive list and certainly would indicate that Almagre developed out of La Perra.

Almagre, however, has a number of individual traits, such as Gary and Kent points, keeled end-scrapers, and canine-shaped stone beads. Almagre bears only a slight resemblance to the succeeding phase, Laguna. In common are choppers, ovoid blades, thick and thin side-scrapers, plano-convex end-scrapers, Gary points, Abasolo points, Nogales points, and Tortugas points, and crude lammelar flakes. But it lacks a whole host of Laguna traits, such as the pottery, the architecture, and many others. It is my belief, however, that there is a thread of continuity from Almagre to Laguna times. However, on the basis of the few traits in common and the cultural data from southwestern Tamaulipas, which we will mention shortly, I would guess that probably Almagre developed into Laguna by cultural phases that have not as yet been found.

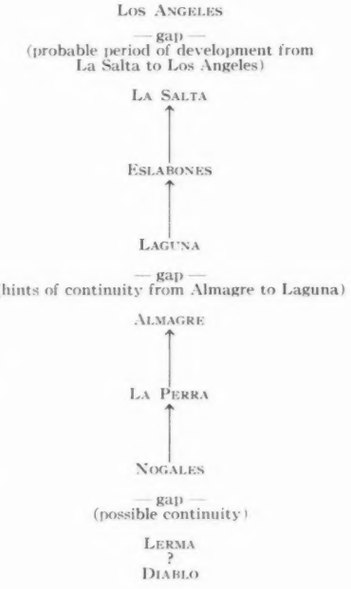
The Laguna Phase starts a new tradition in the Sierra de Tamaulipas which includes ceramics, the projectile points, the architecture, and many new stone artifacts. All these continue into Eslabones times. Eslabones, in turn, has many traits in common with La Salta.

The Los Angeles Phase has some similarities with the earlier horizons. Armadillo, Catan, Matamoros, Abasolo, Nogales, Tortugas, Palmillas, Ensor, and Morhiss points, fine and crude lamellar flakes, square-based blades, bell-shaped pestles, cylindrical manos, angled-back metates, twilled mats, two-yarn Z-twisted maguey cord, square knots, granny knots and overhand knots, spoke shavers, thick and thin flake side-scrapers, large plano-convex end-scrapers, small disk choppers, pebble hammerstones, crude choppers, ovoid bifacial blades, mortars, and bird-bone awls carry on from earlier horizons. Besides these, Breve de Padilla maize, common beans, squash, gourds, and various ceramic details, such as types of vessel forms and exterior brushing, show continuity. But there still are certain major differences between La Salta and Los Angeles. These include a host of specialized traits such as the small projectile points in Los Angeles, and the La Salta architectural traits, various kinds of ceramics, figurines, and the like. I believe that there is continuity from La Salta to Los

Angeles but that the transitional stage between the two has not been found. This hypothesis is supported by our investigations in southwestern Tamaulipas where a culture like La Salta (Palmillas) develops into one called San Lorenzo, which, in turn, develops into a culture like Los Angeles (San Antonio).

In sum, there appears to be a break in the sequence between Lerma and Nogales. Nogales starts a tradition that lasts through La Perra times into Almagre. Between Almagre and Laguna there is again a gap in the sequence, but there are hints that Almagre may have developed into Laguna. Laguna sees a new cultural tradition that develops into Eslabones, which, in turn, gives rise to La Salta. La Salta seems to be ancestral to Los Angeles, but again there appears to be a gap between the earlier tradition and the final culture in the Sierra de Tamaulipas. Diagrammatically, the situation seems to be the following:

TABLE 22



COMPARISONS WITH SOUTHWEST TAMAULIPAS

During the winter of 1954–1955 a preliminary reconnaissance and three extensive and two minor cave excavations were undertaken in southwest Tamaulipas. The survey yielded sixty-one sites. However, more important than the limited survey were the excavations that revealed a sequence of eight cultural complexes. Some of the phases of this continuous sequence are similar to some of those from the Sierra de Tamaulipas, but what is more important is that the others illustrate the type of phases that existed between Lerma and Nogales, between Almagre and Laguna times, and between La Salta and Los Angeles.

The excavation of Tm c 247 in the Sierra Madre of southwest Tamaulipas yielded a sequence of sixteen occupational layers with preserved vegetable remains belonging to seven archaeological phases: Infiernillo, Ocampo, Guerra, Mesa de Guaje, Palmillas, San Lorenzo and San Antonio. Tm c 248 had five stratified cultural complexes in it: Infiernillo, Ocampo, Flacco, San Lorenzo, and San Antonio; Tm c 274 also had four in it: Infiernillo, Flacco, Palmillas, and San Lorenzo. Tm r 241 and Tm r 246 were small excavated ruins of the Palmillas Phase.

Although this sequence perhaps does not cover so great a time span, nor has the area been so well surveyed as the Sierra de Tamaulipas, what has been found is much more complete. Adequate samples of foodstuffs are available from each of the eight horizons as are some perishable artifacts. Furthermore, there seem to be no major breaks in the sequence, and since all but one of the complexes was found in the twenty-six layers of Tm c 247, the stratigraphy is therefore more convincing.

The food remains of the earliest phase, Infiernillo, show that these people were basically nomadic food-gatherers who did considerable hunting. However, even at this stage small amounts of their food, such as gourds (*Lageneria*), domesticated squash (*Cucurbita pepo*), peppers and small runner beans (perhaps wild), were domesticated. Their Abasolo Round-base points, the gouges, the crude choppers, the hammerstones, and the thick and thin side-scrapers are similar to tools of the Nogales Phase. An even larger number of traits, mainly perishable, are similar to those of La Perra. These include: snail beads, bird-bone awls, atlatl foreshafts, small pointed sticks, one-over-one mats, Almagre points, pebble smoothers, overhand knots of yucca, and two-yarn Z-twisted hard maguey cord. Other Infiernillo traits, such as Infiernillo Diamond points, pebble choppers, scraping planes, abraders, split bone awls with basal holes, split or cylindrical conical wooden wedges, wooden foreshafts, wooden firetongs, two-yarn S-twisted cord, Fuegian net bags with rod foundations, interlocking half-hitch woven baskets with a rod foundation, wound loop basket on a rod foundation, and twilled mats with square corners do not have exact counterparts in the earliest phase of eastern Tamaulipas, but the choppers, scrapers, and points bear a resemblance to those in Lerma.

As may be seen, the Infiernillo Phase is not closely related to any of those of the Sierra de Tamaulipas. David Kelley, who dug Tm c 248 (which had the most Infiernillo remains) has suggested that perhaps Infiernillo or something like it in the Sierra de Tamaulipas is ancestral to Nogales and developed from Lerma. Carbon-14 dates of Infiernillo tend to confirm his hypothesis.

The Ocampo Phase was represented by an even larger quantity of foodstuffs. These people were basically plant-collectors who did very little hunting. They cultivated gourds (*Lageneria*), squash (*Cucurbita pepo*), common beans, peppers and small runner beans.

The projectile point complex was like that of Late Nogales and Early La Perra in having Tortugas, Nogales, and Abasolo points, the latter continuing from the Infiernillo horizon. In terms of proportions, Early Ocampo has more Abasolo points, as does Late Nogales, while Late Ocampo has more Tortugas points, as does La Perra. Late Ocampo has also in common with La Perra (and Late Nogales) mortars, choppers, gouges, large and small chipped disks, large plano-convex end-scrapers, thick and thin side-scrapers, hammerstones, split bird-bone awls, small disk scrapers, snail beads, atlatl cane mainshafts, square knots, granny knots, overhand knots and slip knots, full-turned coiled nets, two-yarn Z-twisted cord, small pointed sticks, and checker-woven mats. Chipped disks and disk scrapers, nets, and some of the knots, as well as pebble choppers, scraping planes, conical wood wedges, split wood wedges, atlatl foreshafts, two-yarn S-twisted cord, wound loop baskets, half-hitch woven baskets, twilled mats, and abraders occur in both Ocampo and Infiernillo. Occurring only in Ocampo are large antler flakes, large flake end-scrapers, antler piercers, lance shafts, bevelled sticks, cane knives, and three-over-three woven mats.

In summary, it would appear that in the Sierra Madre, Infiernillo developed into Ocampo, and that Ocampo has sufficient traits in common with La Perra (and Late Nogales) to suggest that they were spatially related. There were significant differences between them in that La Perra had corn, while Ocampo had pepper and beans. This would seem to indicate that these two plants were spreading into the two areas from different centres at different times. Evidently the spread of squash and gourds had taken place still earlier, perhaps from still other centres.

The Flacco Phase developed from Ocampo. These people were also food-gatherers who did some farming or gardening of common beans, peppers, runner beans, panicum, amaranths, gourds, squash, and Bat Cave type of corn, and a very little hunting and snaring. The projectile point complex of Flacco, which includes Tortugas Triangular, Abasolo Round-base, Gary Stemmed, Nogales Triangular, Flacco Indented Base, and Catan Round-base, is very much like that occurring in the Almagre horizon to the east. Besides having these traits in common, they have mullers, mortars, snail-shell beads, choppers, thick and thin flake side-scrapers, gouges, large and small chipped disks, disk scrapers, hammerstones, and bone awls. All of these traits, except mullers, Gary points, Flacco points, and Catan points, were present in the Ocampo horizon. Flacco and Ocampo also had in common: pebble choppers, scraping planes, large flake end-scrapers, large antler flakers, split wood wedges, pointed sticks, abraders, two-yarn Z-twisted cord, two-yarn S-twisted cord, overhand knots, slip knots, and square knots, twilled mats, half-hitch woven baskets with a rod foundation, twilled and three-over-three mats, split wedges, atlatl cane mainshafts, wood atlatl foreshafts, large antler flakers, and pounded sticks. Besides the points and mullers, Flacco had such individual traits as ulna punches, bone awls with pierced ends, fire-drills, spring traps, four-yarn S-twisted cord, cotton fibres (?), braided rope, simple coiled bags, twilled basketry, and twilled mats with a three-over-three weaving at the edges.

Thus Flacco seems to have developed from Ocampo but to have been in contact with, and equivalent to Almagre of the Sierra de Tamaulipas.

Flacco, in turn, developed into Guerra in the Sierra Madre, but we have no cultural equivalent to the east. The Guerra people were agriculturists who grew Bat Cave type corn, squash, gourds, peppers, common beans, small runner beans, and cotton (and perhaps *moschata* squash). They also did a great amount of plant-collecting but only a little hunting. The dominant projectile points of this horizon are Catan Round-base and Matamoros Triangular, though Abasolo and Tortugas (as well as a crude corner-notched and Gary Stemmed point) occurred. Thin and thick choppers, thin and thick side-scrapers, large flake end-scrapers, disk scrapers, small plano-convex end-scrapers, and a few gouges and scraping planes continued to occur. Mullers were fairly numerous and flat paint stones occurred, as did snail beads, split-bone awls, antler piercers, and mollusk shell pendants. Some of the wooden tools are similar to the previous horizon, but others are actually different and include pointed-base atlatl foreshafts, atlatl bunts, pointed sticks, pounded sticks, barbed atlatl foreshafts, rabbit sticks, and one possible arrow mainshaft. The same knots appear as in Ocampo, plus the use of two half-hitches. A whole new complex of string occurred, which included: six-yarn S-twisted cord, four-yarn S-twisted cord, three-yarn Z- and S-twisted cord, Z-twisted cotton yarn, two-yarn S and Z-twisted cord, three-yarn braid, and a peculiar loop-braided cord. Simple coiled nets occurred along with a twined blanket, one-and-one twilled cotton cloth, and a bag with both a simple coiled and lacing technique. All mats were twilled, and baskets were predominantly split-stitch and a bundle foundation, though two varieties of half-hitch weave on a bundle foundation occurred. There can be little doubt that this complex developed out of Flacco, and one might expect that a similar complex may eventually be found in the Sierra de Tamaulipas. Since Guerra developed into Mesa de Guaje, which is like Laguna, it also may be expected that the gap between Almagre and Laguna is not too great.

The Mesa de Guaje Phase had the first pottery in southwest Tamaulipas. These people were farmers growing a number of varieties of corn including Breve de Padilla, *teocentli*, squash, *Cucurbita pepo*, common beans, gourds, and cotton, like Laguna, as well as peppers, lima and runner beans, and *moschata* squash. They also did some food-gathering but little hunting or snaring. Like Laguna, the Mesa de Guaje Phase has Abasolo, Matamoros, Catan, and a straight-stemmed point

(called Mesa Stemmed, and similar to Morhiss), lamellar flakes, flake side-scrapers, metates, cylindrical and rectangular manos, cane atlatl and (arrow?) mainshafts, pointed sticks, overhand and square knots, two-yarn Z-twisted cord, Z-twisted cotton yarn, two-over-two twilled cotton cloth, twilled mats, molcajetes with incised interiors (but without short solid conical feet), Palmillas Plain (like Pueblito Plain), Infiernillo Brushed (like Pueblito Brushed), and Mesa Black. Also occurring in Mesa de Guaje were a number of kinds of choppers and side-scrapers, a gouge, a disk scraper, paint stones, a wooden spring trap, a palm leaf carrying-bag, slipknots, twilled one-over-one cotton cloth, a variety of two-, three-, four, and six-yarn cords, simple coiled nets, lace nets, checker mats, and twilled mats with designs woven into them by dyed red or black palm strands, split-stitch bundle foundation bottles or baskets with or without designs on them, and four distinctive pottery types. Because of the host of traits in common between Guerra and Mesa de Guaje there can be little doubt that one developed from the other, providing the first example of a transition from a pre-pottery to a pottery horizon in Meso-America. The many traits in common or similar between Laguna and Mesa de Guaje also indicate that they are related. One noticeable difference is that Laguna sites are large and numerous in the Sierra de Tamaulipas, while in the Sierra Madre our survey uncovered only one small (doubtful) Mesa de Guaje site, without temples. This difference may be due to the fact that Laguna was closer to Huastec centres during El Prisco times and had more cultural stimulation, or that Mesa de Guaje is slightly older than Laguna and possibly ancestral to it. If it is the latter (and Carbon-14 tends to indicate that it may be), then the stage equivalent to Laguna is absent in excavation in the Sierra Madre.

The Palmillas Phase was the cultural apogee of southwest Tamaulipas. These people had a subsistence based upon agriculture. They grew several varieties of corn (including Breve de Padilla), *pepo*, *moschata*, and *mixta* squash, gourds, chili, tobacco, runner beans, sunflowers, panicum, tobacco, amaranths, manihot, lima beans, six varieties of common beans, and some cotton. They did a little food-gathering and hunting.

The Palmillas Phase has resemblances to both La Salta and Eslabones. The architecture, including circular masonry house-platforms, pyramids around a plaza, and ball courts, is similar. Occurring in all three of these phases are Catan, Matamoros, Tortugas, Nogales, Abasolo, Palmillas, and Morhiss Stemmed points, thin side-scrapers, lamellar flakes, angled-back metates, rectangular and cylindrical manos, bell-shaped pestles, mold-made figurines, gouges, disk scrapers, and celts. The pottery of the three phases, though slightly different, has many resemblances. Palmillas Plain, Palmillas Polished, and Infiernillo Brushed are similar to Pueblito Plain, La Salta Polished, and Pueblito Brushed. Much of the Palmillas Polished ware has engraving on it, like La Salta Polished of the La Salta Phase.

There is fairly good evidence for continuity in the Sierra Madre from the Mesa de Guaje Phase to Palmillas as most of the above-mentioned traits occur in both, as well as thick and thin choppers, paint stones, atlatl foreshafts, cane atlatl mainshafts, pointed sticks, cane arrow mainshafts, overhand knots, square knots and slip knots, two-yarn Z-twisted maguey cord, four-yarn S-twisted maguey cord, Z-twisted cotton, twilled one-over-one and two-over-two cloth, simple coiled nets, twilled mats, split-stitch baskets, and Infiernillo Brushed and Palmillas Plain pottery types. Besides these traits, Palmillas has a few diagnostic traits which include: Palmillas Serrated points, chipped celts, teardrop end-scrapers, antler piercers and flakers, long bone fleshers, conical wedges, arrow foreshafts, cane cigarette butts, cane tubes, cane knives, platform clay pipes, two half-hitch knots, four-yarn Z-twisted cord, carrying baskets made of palm leaves, pack-boards with a wooden rim and a net centre, twilled mats with intricately-woven designs, alligator skin bags, leather thongs, jaguar skin belts, and a number of distinctive pottery types including Zaquil Red, Zaquil Engraved, Palmillas Black, Palmillas Polished, Palmillas Thick, and some specialized molcajetes types.

The Palmillas horizon is ancestral to San Lorenzo. There seems to be no cultural equivalent in the Sierra de Tamaulipas. San Lorenzo may be contemporaneous with the gap between La Salta and Los Angeles. The San Lorenzo peoples were farmers who grew almost the same plants as those of the Palmillas Phase. Abasolo, Tortugas, Nogales, Catan, Matamoros, Palmillas Corner-notched, and Palmillas Serrated points continued to be manufactured, but Starr, Fresnos, Harrell, San Lorenzo Side-notched, and Jaumave Corner-notched appear as new types. Most of the older Palmillas scraper types occur as a minority group, and the small teardrop and triangular end-scrapers are much more prevalent. Paint stones, metates, cylindrical and rectangular manos, lamellar flakes, and choppers continue, as do split-bone awls, antler flakers, atlatl mainshafts and foreshafts, pointed sticks, wooden wedges, arrow mainshafts and foreshafts, cane cigarettes, cane tubes, elbow clay pipes, overhand knots, square knots, and half-hitch knots, most of the string types, twilled one-over-one cotton cloth, simple coiled nets, twilled mats, skin belts and bags, and Palmillas Plain and Infiernillo Brushed pottery types. Diagnostic of this horizon are ulna bone weaving tools, spring traps made from wood, closely-woven twilled cloth, lace netting, split-stitch baskets with very wide weaving elements, huaraches, and a whole series of new pottery types, including San Lorenzo Smooth, San Lorenzo Engraved, San Lorenzo Black, Ocampo Corrugated, and San Lorenzo bowls with interior incising like molcajetes but without vessel feet. There also are a number of changes in vessel forms.

San Lorenzo developed into the San Antonio Phase.

The San Antonio Phase seems to have lasted up into historic times and not only is contemporaneous with Los Angeles Phase but bears many resemblances to it. These people were basically agriculturists, but they did considerable food-gathering. Like Los Angeles, they grew Breve de Padilla corn, squash (*pepo*), gourds, runner and common beans, cotton and tobacco. They also grew walnut squash (*moschata*), and chili.

San Antonio and Los Angeles have Fresnos, Starr, Pasitas, Matamoros, Catan, Abasolo, Nogales, and Tortugas points in common. San Lorenzo Corner-notched is also quite similar to Diablo Corner-notched. Other traits in common are thick and thin choppers, thick and thin side-scrapers, flat end-scrapers, disk scrapers, teardrop end-scrapers, paint stones, rectangular metates and manos, bird-bone awls, tubular bone beads, shell disk beads, pointed sticks, clay pipes, arrow foreshafts and mainshafts, cigarettes, cane flutes, overhand knots, square knots and slip knots, two-yarn Z-twisted cord, twilled mats, split-stitch basketry, and various articles of leather. Furthermore, San Antonio Smooth pottery is very similar to Los Angeles Plain, and San Lorenzo Brushed is like Los Angeles Brushed. Besides these traits, San Antonio has some different ones, many of which are like those in San Lorenzo. These include Palmillas Serrated point, pebble choppers, wooden conical wedges, cane atlatl mainshafts, wooden fragments of bows, string tied with granny knots, Z-twisted cotton yarn, double yarn S-twisted cord of maguey fibres, and four yarns composing S-twisted maguey cord, tightly-woven twine blankets, one-over-one twilled woven cotton cloth, simple coiled nets, one-over-one mats of palm fibres, a series of belts made from skins of animals, deerskin bags, huaraches, clay pipes, Infiernillo Brushed pottery, Ocampo Corrugated pottery, and San Antonio Polished Black pottery. Appearing only in San Antonio are semi-lunar scrapers, clay pestles, antler piercers, cane knives, cane scraper handles, braided cord, double cloth woven from cotton, and San Antonio Red sherds.

In summary then, the earliest two cultures of the Sierra de Tamaulipas, Diablo and Lerma, have no direct relationships with the cultures of the Sierra Madre. Infiernillo, the earliest culture in the Sierra Madre region, also appears to be unconnected with the Sierra de Tamaulipas, though there is the possibility that it represents a transition between Lerma and Nogales. The Ocampo culture of southwestern Tamaulipas seems to be related to both Nogales and La Perra. Flacco and Almagre are very closely related and represent one of the best ties between the two areas. Guerra, in southwestern Tamaulipas, seems to have existed during a time period which is as yet unfilled in the Sierra de Tamaulipas. Mesa de Guaje is distantly related to Laguna and it may be just slightly earlier. Palmillas seems to represent a fairly long time period and has many resemblances to both the Eslabones and La Salta Phases of south-central Tamaulipas. San Lorenzo again seems to have existed at a time period which is not yet filled to the east. San Antonio and Los Angeles are extremely closely related, and both extend into the historic period.

All in all, the closest ties of the Sierra de Tamaulipas seem to be with the southwestern part of the state, and I believe there is some justification for considering these two regions as being part of the same cultural area for an extremely long time period.

THE HUASTECA

South of the Sierra de Tamaulipas, in the semi-tropical savannah lying in both Tamaulipas and Vera Cruz, as well as in the highlands of Vera Cruz and eastern San Luis Potosí, is the Huasteca.

This region is considerably better known archaeologically than the other surrounding the Sierra de Tamaulipas. The best-known portion of the Huasteca is the Panuco–Tampico region (only about sixty miles south of the nearest portion of Sierra de Tamaulipas) where both Ekholm and myself have made strati-tests. From Ekholm's [1] and my analysis [2] of stratigraphic materials, a sequence of nine periods has been established. These periods are based mainly upon a study of the ceramics from two deep, stratified excavations, but the sequence of figurines, projectile points, and various other artifact types, seems to correlate with the ceramic periods. Furthermore, Ekholm dug a number of other sites that tend to confirm this sequence. Since Ekholm's numerical designation of his later six periods when coupled with my three earlier periods leads to some confusion, it seems wise to designate the various periods by a proper name. In terms of such a designation, the sequence from late to early is as follows:

Panuco Period (VI of Ekholm's system)
Las Flores Period (V of Ekholm's system)
Zaquil Period (IV of Ekholm's system)
Pithaya Period (III of Ekholm's system)
El Prisco Period (II of Ekholm's system)
Chila Period (I of Ekholm's system)
Aguilar Period
Ponce Period
Pavon Period

The continuance of the Heavy Plain ware through all nine periods, the presence of seventeen pottery types in two or more periods, the various developmental trends in decoration and vessel shape that run through a number of periods, the continued use and development of various figurine types through the sequence, as well as the occurrence of a number of other artifact types in two or more sequential periods, are considered to be overwhelming evidence by Ekholm and myself that there is cultural continuity and development in the nine sequential periods in the Tampico–Panuco region.[3]

[1] Ekholm, 1944.
[2] MacNeish, 1954.
[3] Ekholm, 1944: 504.

However, in spite of the numerous continuities, each period does have a series of distinctive characteristics, which Ekholm and I have gone to some lengths to describe and illustrate in our respective publications. Furthermore, on the basis of trade sherds and various cultural features in the Tampico–Panuco chronology that are similar to those found in periods in other regions, it has been possible to align tentatively this Huastec sequence with others farther south in Meso-America.

Since I shall presently be tentatively correlating certain of the periods of the Sierra de Tamaulipas with those of the Huasteca, it seems worth while to review the temporal correlations of the Panuco sequence with other parts of Meso-America and the evidence for such chronological alignments. Such a review, I believe, will make it possible to envisage part of the Canyon Diablo sequence (and the Tampico–Panuco Periods) in terms of the cultural developments and sequence in Meso-America in general. Such a review will illustrate the fact that for many centuries there was considerable cultural similarity from Guatemala to the Soto la Marina River and perhaps not as much cultural lag in the extremities of Meso-America as some archaeologists would have us believe.[4]

The earliest period in the Tampico–Panuco region is the poorly defined Pavon Period. As yet, it is not possible to correlate this ceramic period with other cultural periods in Meso-America. It may be that this cultural complex, without figurines and having in its ceramic features only a few vessel forms (mainly ollas and flat-bottomed flaring-sided bowls), little decoration (only a few sherds with overlapping circular punctates in the bottom of bowls), and primarily plain pottery (though a few sherds with a red wash or a white wash appear), and evincing only thin cultural deposits (indicating small villages of agriculturists) is older than most ceramic-bearing complexes described for Meso-America[5] (Yojoa monochrome horizon of Honduras excepted).[6]

The second period at Panuco, the Ponce Period does have extra-areal affiliations. The distinctive pottery of this monochrome horizon is Ponce Black, which is very similar to, if not the same as, the Black Ware of Lower Tres Zapotes in southern Vera Cruz. Furthermore, the vessel forms of both Ponce and Lower Tres Zapotes, with silhouette bowls and flaring-side flat-bottomed bowls (without feet) being among the most important shapes in both horizons, are almost identical. The figurines of Ponce, though vaguely similar to those of Lower Tres Zapotes, are most similar to the earliest ones found in the Maya area (Mamon at Uaxactun, Yarmuela I of Honduras, and various specimens from the Formative of the Guatemala Highlands).[7]

The Aguilar Period has, besides the Ponce Black pottery, a few "baby-faced" figurines like Middle Tres Zapotes of lower Vera Cruz. The incised decorations on the interior of silhouette bowls which often have three long solid conical feet seem to be analogous to those from early El Arbolillo and early Tlatilco, and may indicate a temporal correlation between these horizons of the Huasteca and of the Valley of Mexico.[8]

The Chila Period (I) reveals little good evidence for temporal correlations with other areas. Ekholm has noted that some of the white-slipped pottery (Chila White) is like that found in Monte Alban I and in the Chicanel Period of Uaxactun in the Peten of Guatemala. The linear punched decoration, characteristic of this period, seems quite similar to some found on the interior of bowls in burials that have been assigned to Tlatilco II in the Valley of Mexico.[9]

The El Prisco Period (II), which is perhaps better known than any of the previous periods, has a number of general connections with the Valley of Mexico on the Ticoman horizon which include pottery, ladles, bowls with a basal ridge, zoned punctate decoration, fresco-decorated pottery, and small flat-backed figurines with coffee-bean eyes. Ekholm also noted that many of the hand-made figurines and the Black Ware of the El Prisco Period have a general resemblance to that of Middle Tres Zapotes.[10]

The Pithaya Period (III), on the basis of the slab-type vessel supports, may be correlated with Teotihuacan II and III in the Valley of Mexico. Ekholm, on the basis of the Panuco Fine Paste Ware resemblances to some ceramics at Tajin, has postulated a connection with central Vera Cruz in this period.[11]

The Zaquil Period (IV), on the basis of the pottery, has few analogies to other areas, other than that some of the engraved ware has vague resemblances to some at Tajin and even vaguer resemblances to some at Teotihuacan. However, the mold-made figurine types of the Zaquil Period have definite analogies to those in Teotihuacan IV in the Valley of Mexico.[12]

The Las Flores Period (V) has been connected with the Mazapan–Aztec I horizon, because in both areas vessel forms occur with flat bottoms, flaring sides, horizontally-extended lips, and large hollow cylindrical legs, as well as pottery like Plumbate Ware, certain ceramic decorations that seem to be signs common in Aztec symbolism, spindle whorls, distinctive styles of stone carving, shell working, copper working, and certain figurine types.[13]

The final period in the Huasteca, the Panuco VI, seems to be contemporaneous with the Aztec III horizon in the Valley of Mexico on the basis of the similarity of

[4] Krieger, 1951.
[5] MacNeish, 1954.
[6] Strong, Kidder, and Paul, 1938.
[7] MacNeish, 1954.
[8] MacNeish, 1954.
[9] Ekholm, 1944: 423–424.
[10] *Ibid.*, 425–426.
[11] *Ibid.*, 426–427.
[12] *Ibid.*, 503.
[13] *Ibid.*, 504.

designs in Aztec III Black-on-Orange to those of Tancol Brown-on-Buff in the Huasteca.[14]

Having reviewed the tentative correlations between the cultural periods of the Tampico–Panuco region with those of the more southerly regions, let us compare the Huastec sequence with that of the Sierra de Tamaulipas.

As yet there is nothing comparable in the Huasteca to the five earliest pre-ceramic complexes of the Canyon Diablo. Since the culture areas are so close to one another, it might be argued that these five Canyon Diablo periods—Diablo, Lerma, Nogales, La Perra, and Almagre—on the basis of typology and knowledge of the general trends of cultural evolution, precede any ceramic period so far found in the Tampico–Panuco region. The Carbon-14 date of 4,445 years ago for La Perra would certainly indicate that at least Diablo, Lerma, Nogales, and La Perra were before anything so far found in the Huasteca. Whether all of Almagre is older than all of the Panuco periods, or whether the earlier Huasteca periods overlap with Almagre, cannot be decided on the basis of our present evidence.[15] This is an important problem for future work in this region and one that I tackled unsuccessfully when I worked north of Panuco in 1948.

It is not until the time of the three phases of Laguna, Eslabones, and La Salta in the Sierra de Tamaulipas that one finds definite links with Huastec cultural horizons. On a general level, the fact that round house-platforms, truncated rectangular and conical pyramids, angled-back metates, molcajetes, carinated vessels, burials in vessels, roller manos, pottery ladles, pottery whistles, bell-shaped pestles, jadeite beads, lamellar flake knives of obsidian, celts, and adzes are found in all of these phases, and in the El Prisco (II) to Panuco (VI) periods of the Huasteca indicates considerable exchange of ideas (and objects) and delineates a definite cultural connection of some sort between the two areas.

The earliest pottery culture of the Sierra de Tamaulipas, the Laguna Phase, yielded eight figurines belonging to three types: Panuco A (4), Panuco Bulging-eye (4), and Panuco Coffee-bean Eye (1). As is obvious from their names, these figurines are Panuco types (though the clay in them indicates they were probably made locally), and the combination of these three types occurs at Panuco only in the last half of the El Prisco Period (II).[16] Confirming the Laguna–El Prisco temporal equation is a series of distinctive ceramic features held in common, which are as follows: bowls with a basal ridge, short solid conical vessel feet only, bowls with vertical recurved sides, bowls with incurved vertical sides, and bowls with flaring sides bearing thickened or everted lips. These features occur only in the El Prisco Period (II) of the sequence in the Tampico–Panuco area, and are confined to Laguna in the Sierra de Tamaulipas. Molcajetes with interior bottoms decorated by large quadrants filled by parallel lines, hemispherical bowls dominant over incurved-rim bowls, ladles of pottery, bulbous-hipped figurine bodies, bark-beaters, disks, metates of vesicular lava, flat oval manos, bell-shaped pestles, round stone house-platforms, and truncated conical mounds are other features in both the El Prisco (II) and Laguna Period. These many features in common between Laguna and El Prisco speak for a contemporaneity of these two periods. Confirming these indications are sherds of El Prisco Black in a Laguna component. There is no reason to assume that there was much, if any, cultural lag between these regional phases, particularly since some sites of the two regions are only a short distance (about fifty miles) apart.[17]

The Eslabones period of the Sierra de Tamaulipas is not well defined, but what we have of it speaks for contemporaneity with the Pithaya (III) Period of the Tampico–Panuco region. Specific features held in common between these two periods are the presence of hollow conical pierced vessel feet in conjunction with small solid conical feet, the rise of the incurved-rim bowl (or seed bowl), the dominance of the flaring-sided carinated bowl, and portrait-type figurines. Perhaps the best evidence for the equation of the Eslabones–Pithaya periods is the fact that Laguna equates well with El Prisco (II) and La Salta equates well with Zaquil (IV), and that, stratigraphically, Eslabones is between Laguna and La Salta, and Pithaya (III) is stratigraphically between El Prisco (II) and Zaquil (IV).

As I have just stated, La Salta evinces many connections to the Zaquil Period (IV) at Panuco. Common to both are: mold-made figurines, clay cylindrical whistles, lamellar flake knives, sherd pendants, corner-notched projectile points, small triangular side-notched points of obsidian, engraved pottery decoration, hollow vessel feet dominant over small nubbin feet, hemispherical bowls, as well as incurved-rim bowls and plates, and outcurved outflaring carinated vessels. One of the engraved motifs of Zaquil Black Incised (which really should be termed Zaquil Black Engraved), a series of small triangles filled with parallel lines parallel to one

[14] *Ibid.*, 504.

[15] Roberto Pavon showed me Gary Stemmed and Tortugas Triangular points from a possible Aguilar level which may be interpreted as meaning that Almagre overlaps it. However, more evidence is needed on this matter.

[16] Ekholm, 1944: 457–459.

[17] Here it is necessary to challenge a statement by Alex Krieger. In his review of Aveleyra's "Prehistoria de Mexico," *Amer. Antiquity* **16** (4): 358, Krieger asserts: "In the Formative (Archaic) period, the northern boundaries of Meso-America rather clearly could not have been further north than the Panuco River Valley, and from here northward ceramic and agricultural practices belong to progressively later periods." That the Formative period was north of the Panuco is clearly illustrated by the above evidence of a Laguna Phase connection with the El Prisco (II) period from Panuco. Perhaps Krieger should correct his statement to read "Soto la Marina River" not "Panuco River."

side of the triangle, is identical with some of the La Salta engraved sherds. Perhaps more specific than these is the presence of a Zaquil Incised sherd in the La Salta Phase, Layer 3 of Tm c 314.

Materials representing the Las Flores (V) Period are absent from the Sierra de Tamaulipas. The Panuco (VI) Period is, however, well represented by trade sherds in the Los Angeles Phase. Panuco sherds include ones belonging to the following types: Tancol Polychrome, Huasteca Black-on-White, Tancol Brown-on-Buff, Heavy Plain Ware, Zaquil Red, and Panuco Red-on-White.

Thus Laguna equates with El Prisco, Eslabones with Pithaya, La Salta with Zaquil, and Los Angeles with Panuco. In the first three periods there seems to have been considerable inter-influencing between the two areas, while in the final period Los Angeles was receiving trade objects from the Huasteca.

COMPARISONS WITH NORTHERN TAMAULIPAS

Tamaulipas north of the Sierra de Tamaulipas has been considered to be in the Arid Upper Austral Biotic zone. The actual topography of this region is quite varied and is the basis for a number of sub-zones. The central southern part of this area is part of an eroded peneplain and has been classified as belonging to the San Fernando ecological zone. East of this area are the coastal flats, which I have classified as the Catan ecological zone. North of these two areas are three other ecological zones. One is the delta of the Rio Grande River; another is the area of both sides of the Rio Grande, while the third is the San Carlos Mountains. Climatically the whole area is extremely dry, and there seems to be no definite rainy season. When rains do occur, the run-off is very quick and there is a sharp transition from a hot dusty atmosphere with a barren appearance to a humid atmosphere with all the little arroyos filled with raging torrents. Frosts occur occasionally in the winter. In the main, vegetation consists of tall grasses, mesquite, a wide variety of cacti, and dense thorny bushes.

Ethnologically two groups seem to have occupied the area, the Coahuiltecan and the Tamaulipecan tribes. On these groups, all now extinct, few good ethnographic reports exist. What little can be learned from the early historic documents is that these groups lived in small bands, were nomadic hunters and food-gatherers, half-starved most of the time, and, as far as the Spanish explorers were concerned, were savage and without any particularly admirable traits.

In the following section I shall briefly give what we know of the archaeology of the area. Since most of these data are based upon survey and not excavation, it is extremely tentative. Furthermore, since on an early prehistoric level the culture seems to be similar in all of the ecological zones, I have not tried to describe each zone separately. It is hoped that the work in the Falcon Dam area and the ethnological investigations done in connection with this work will yield information that will supplement, or even replace, the meagre information I am about to present. However, in spite of the obvious deficiencies of my present data, I believe they are worth presenting, as this part of Tamaulipas, particularly on the early levels, has many connections with the cultural phases of the Sierra de Tamaulipas.

For a considerable length of time investigation has been going on in various parts of this area and has been described spasmodically for the last thirty years. The region of Tamaulipas adjacent to Cameron County, Texas, was for thirty years scientifically surveyed by the late A. E. Anderson of Brownsville, Texas, an amateur archaeologist whose techniques of archaeological reconnaissance could be profitably copied by most professional archaeologists. Anderson also undertook an equally careful survey of Cameron County, Texas. When I began to work in 1945 in Tamaulipas, one of the first things I endeavored to do was to examine Anderson's collection and notes. All of his specimens were numbered, and their assignment to a site location could be accomplished by reference to his field catalogue. Fortunately, I was able to obtain from Mr. Anderson's surviving relatives the whole collection, as well as his field notes, and they are now deposited in the Department of Anthropology at the University of Texas, where I analyzed them. By studying the field notes, I was able to locate accurately on the map fifty-eight sites in Tamaulipas that had adequate samples from each. Later I examined materials from the 198 sites he had found in Cameron County, Texas. Of these latter sites I made an intensive study of the twelve most important. Somewhat later, on the Tamaulipas side of the Rio Grande Delta, I checked the location of twenty-four of the fifty-eight sites by visiting them with Louis Lollun (a former worker for Anderson) as my guide. From this checking it became obvious that the locations of Anderson's sites were accurately recorded, and the few specimens found were of exactly the same sort that he had uncovered. I was fortunate enough to discover twelve new sites. Thus the survey of northeasternmost Tamaulipas netted seventy sites with many thousands of specimens. For convenience, both Anderson's sites and mine were given survey site numbers in accordance with the system for designating sites in Tamaulipas. I visited all twelve sites in Cameron County and, since this is outside Tamaulipas, left the same site numbering that Anderson used. Quite frankly, I had always planned to dig one of these sites to supplement the survey material. A week was spent testing some of the better sites Anderson had found. Digging even these best sites was most discouraging and yielded few artifacts per hour or even per day. Nevertheless, this very paucity yielded information, for the forty-eight sites I saw were all relatively small, and in each of them artifacts came from a thin occupational level. It therefore

seems safe to conclude that all materials at all sites were deposited by a single brief occupation by a single group. In three places, sites were found eroding out of the banks of arroyos where one occupational level was above another. This is the nearest thing we have to stratigraphy in the region.

The second period of survey came in 1945–1946. In the winter of 1946 Jack Hughes did a brief survey along the Matamoros to Ciudad Victoria highway and netted twelve sites.[18] I worked in the interior and found forty-six additional ones.

The final period of work in this area came in 1950–1953 when a group undertook archaeological salvage work in the Falcon Dam area. Since I only cursorily examined the materials found by the University of Texas,[19] I have included in this study only those found by Aveleyra. All in all, I have examined and studied materials from 126 sites.

Of these sites, five were excavated by our parties. One was Tm c 29 at the *ejido* Repelo. Here in 1946 my wife and I picked fifty-nine artifacts, and I collected an additional 304 in 1949. Arroyo banks revealed artifacts to a depth of three feet below the surfaces, and the local inhabitants said "giant's bones" had been found. Furthermore, every type of projectile point (Lerma points excepted) known from Tamaulipas, as well as a few not known elsewhere, were in our collections, along with some sherds. As the site potentially looked rich and the chances of stratigraphy seemed good, we undertook excavation in 1949.

The site is situated in a rather large basin in the dissected limestone peneplain. It may very well have been a lake basin at some time in the past, and even now there are numerous active springs in the area. The greatest artifact concentration was just south of the southernmost house of the *ejido* and east of the Palo Alto–Repelo road. First, eleven five-foot squares were sunk in the site in order to determine the region of maximum artifact concentration, as well as the best stratigraphy. Since one of these tests (No. 5) showed promise, we enlarged the square to a trench twenty-five feet long and five feet wide. The soil, except for the humus, was composed of tightly knit clay which appeared to be alluvium washed down from the surrounding hills. Since the clay was extremely hard (and since we broke two of our four trowels), we dug alternate five-foot squares by removing six-inch levels by vertical slicing with a mattock. All soil was then shovelled (and pounded) through a half-inch mesh screen. Stratigraphically, the top four to six inches was composed of dark grey humus. This humus overlay a thick layer of grey clay from six to twenty-eight inches in depth, which, in turn, capped a yellow clay. In the grey clay to a depth of ten inches, in the south end of the trench, there was one small hearth, while the lower six inches of the grey clay was slightly darker than the rest of it. Artifacts came from only the humus or grey clay.

Although our sample is far from adequate, definite artifact differences appear in the four levels of this main excavation. The top level (0–6 inches) appears to be a component of the Catan Complex and contained the following:

5 Starr Concave projectile points
1 Fresnos projectile point
3 Matamoros Triangular projectile points
1 Catan Round-base projectile point
1 Triangular point with a V-shaped base
1 Abasolo Round-base projectile point
2 Fragments of Nogales Triangular projectile point
1 Spoke shaver
1 Thumbnail end-scraper
1 Small round plano-convex end-scraper
6 Thin flake side-scrapers
1 Small chipped disk
2 Choppers
3 Big blade fragments
1 Piece of a grinding stone
6 Sherds
74 Flint chips
22 Mollusc shells
4 Snail shells
3 Turtle shell fragments
11 Snake vertebrae
3 Deer bones
19 Other bones

The second level (6–12 inches) appears to belong to an artifact complex that is unknown except at Tm c 29. Furthermore, the artifacts from this level are too few to justify establishing a new complex. The artifacts from this level include the following:

2 Ensor Side-notched projectile points
1 Tortugas Triangular projectile point
1 Nogales Triangular projectile point
1 Matamoros Triangular projectile point
1 Point fragment
1 Small chipped disk
4 Flake side-scrapers
1 Chopper
1 Ovoid blade
1 Spoke shaver
1 Large flake side-scraper
11 Unidentified bones
2 Mollusc shells
63 Flint chips

Level 3 (12–18 inches), which is in the top part of the dark grey clay, is a component of the Abasolo Complex. The following were found in this level:

3 Tortugas Triangular projectile points
1 Matamoros Triangular projectile point

[18] Hughes, 1946.
[19] Aveleyra, 1951.

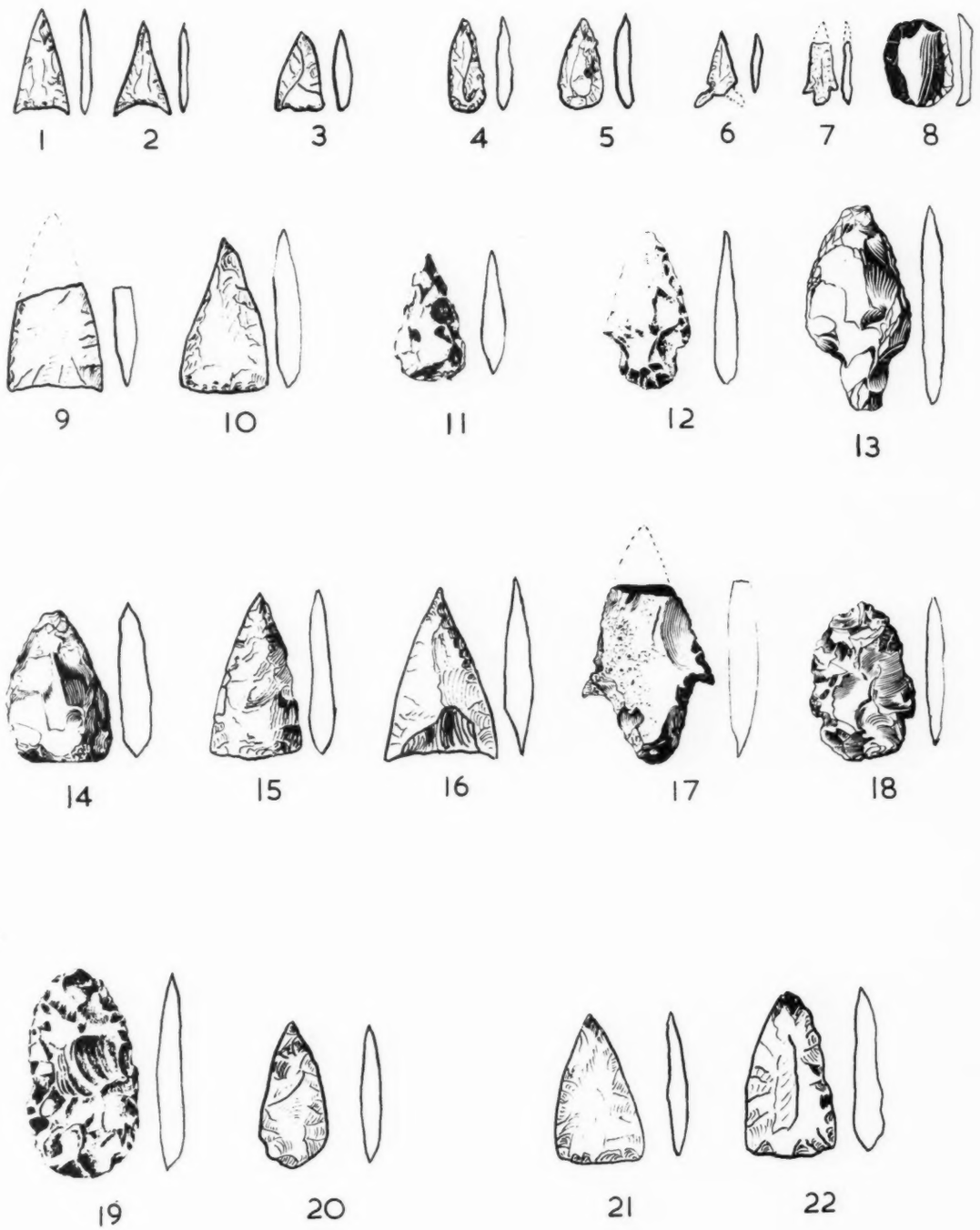


FIG. 50. Sequence from Northern Interior Tamaulipas—Tm c 29 (1/2 natural size). Nogales Phase (19–22), Repelo Complex (14–18), Abasolo Complex (9–13) and Catan Complex (1–8) projectile points. 1–2. Brownsville Concave. 3. Matamoros Triangular. 4–5. Catan Round Base. 6. Repelo Side-notch. 7. Aberrant Corner-notched point. 8. Small disk scraper. 9. Tortugas Triangular. 10. Matamoros Triangular. 11. Abasolo Round-base. 12–13. San Fernando Stemmed. 14. Abasolo Round-base. 15. Abasolo Triangular. 16. Tortugas Triangular. 17. Langtry Stemmed. 18. Ensor Side-notched. 19–20. Abasolo Round-base. 21–22. Abasolo Triangular.

1 Abasolo Round-base projectile point
1 San Fernando Stemmed projectile point
1 Catan Round-base projectile point
1 Corner-notched point (Palmillas Corner-notched?)
2 Point fragments
3 Small flake side-scrapers
1 Large flake side-scraper
1 Large plano-convex end-scraper
2 Gouges
1 Chipped disk
2 Ovoid blades
1 Chopper
67 Flint chips

The lowest levels of the grey clay, just above the yellow clay, and eighteen to twenty-six inches below the surface, contained artifacts of the Nogales Phase:

2 Abasolo Round-base projectile points
1 Nogales Triangular projectile point
1 Small chipped disk
1 Small plano-convex end-scraper
1 Ovoid blade fragment
2 Large flake side-scrapers
9 Chips

In 1946, Tm c 34, on an island called Isla de Piedra de Lumbre at the mouth of the Soto la Marina River, was excavated by my wife and myself. The small island, about one hundred yards in diameter, had a maximum height above the water of about eight feet. The entire surface of the island was covered with shell. A trench fifteen feet long, five feet wide, and four feet deep, was sunk into the east end of the island. The site was dug in one-foot levels by trowel, and the back dirt was removed by shovel.

Analysis of the materials revealed Levels 1 and 2 to contain sherds of Panuco Period (VI): Huasteca Black-on-White, Tancol Brown-on-Buff, Tancol Polychrome, Las Flores Relief, Las Flores Black-on-Red, metate fragments, and one Matamoros point. The lower one foot contained only sherds of Las Flores Period (V) plus a fire pit. This layer had Zaquil Red, Heavy Plain, Panuco Grey, Las Flores Red-on-Buff, Las Flores Black-on-Red, Las Flores Relief, and Las Flores Incised pottery types [20] as well as fragments of a metate, obsidian, and a piece of a large ovoid blade. I consider the site to represent a northward extension of the Las Flores and Panuco Periods of the Tampico–Panuco region, and I believe its occupants to have been Huastecs.

In Santa Rita Bay, just south of Catan Bay, along the Laguna Madre, a third site, Tm c 184, was dug by James Garner and me in 1949. Here a dark cultural layer underlay a brown clay layer with shells, which, in turn, underlay the yellow clayish loess of the dune. Six five-foot squares and one trench, twenty-five feet by five feet, were dug by shovel in six-inch layers and screened. The cultural material was not abundant in the excavation, but most of it seemed to belong to early Panuco Period (VI) of the Huasteca.

A fourth site, Tm c 73, on the south end of Catan Bay, was tested by four five-foot squares which yielded only five sherds: Zaquil Red (2), Tancol Polychrome (1), and Huasteca Black-on-White (2). A surface collection netted a large sample which allowed it to be classified as an early Panuco Period (VI)–late Las Flores Period (V) site.

Site Tm c 200, the final excavated site, is on the second hill northwest of where the Arroyo Catan enters Catan Bay of the Laguna Madre. Along the southeast edge of this small flat-topped knoll, on the beach of the Laguna Madre, were a number of artifacts of both the Abasolo and Catan complexes. With the hope of finding stratigraphy, we undertook excavations. Nine five-foot squares were sunk in the site, and later two or three squares were connected to form a twenty- by five-foot trench. The stratigraphy of the site was as follows: A thin layer of windblown sand overlaying a brown windblown clay covered most of the site. These strata capped a dark grey stratum containing fish bones, rodent bones, and a few deer bones, charcoal, and six artifacts of the Catan Complex. This stratum overlay yellow clay. It was not possible to discern where the Abasolo artifacts on the surface originally came from. One hundred yards west of the site, in a pit extending from the same dark-grey clay Catan stratum, was a double flexed burial containing two bone tube wrist-ornaments. In this area a study of the bank revealed a lower dark stratum, one inch under the top of the yellow clay, with a few flint chips and a gouge fragment sticking out of it. It may be the Abasolo Complex cultural layer, but as stratum was thin and the over-burden (about four feet thick) too great, we did not dig it.

More profitable, in terms of stratigraphy, than these excavated sites were a number found along the banks of arroyos where one occupational level could be seen superimposed upon another. I shall briefly enumerate these. Site Tm c 192 occurred on top of the south bank of the Arroyo Jimenez about 150 yards southeast of the Palo Alto–Repelo road. A surface collection netted one Nogales Triangular-type and two Tortugas projectile points, one small flake side-scraper, and parts of four big blades. This site is classified as a component of the Abasolo Complex. It is definitely over a cultural stratum filled with snail shells (Tm c 22), which is buried six feet below the top of the bank along the side of the Palo Alto–Repelo road on the south side of the Arroyo Jimenez. Tm c 22 contained five Abasolo Round-base and one Nogales Triangular type of projectile points, one ovoid and one square-based blade, three flake side-scrapers, one large plano-convex end-scraper, one chipped disk and one chopper, and it is thought to belong to the Nogales Phase.

Not far north of Rancho Los Lidios on the San Fernando River, a ferry crosses an inlet of the Laguna

[20] Ekholm, 1944.

Madre. On top of the north bank of this inlet, about one hundred yards east of the ferry crossing, is site Tm c 48. This component of the Abasolo Complex contained six Tortugas Triangular, one Matamoros Triangular, one Catan, one Nogales Triangular, one Langtry Stemmed, one San Fernando Stemmed and two Abasolo Round-base projectile points as well as one small plano-convex end-scraper, one ovoid blade, and two disk scrapers. These were in a stratum 3 feet above that containing the materials of Tm c 53. Tm c 53 lay three hundred yards farther east along the same bank. Five Abasolo Round-base and three Nogales Triangular, four Tortugas Triangular, one Morhiss Stemmed projectile point, and one small flat end-scraper occurred as well as twenty-five sherds, probably of modern origin were found (along with one small, ill-tempered rattlesnake) on the beach in front of this site. This lower component has been classified as being of the Repelo Complex.

The final stratified sites were on Carrisal Island at the mouth of the San Fernando River. Here on top of the bank on the northwest end of the island was a small component, Tm c 56. Among the oyster shells were one Starr Concave projectile point, one small thumbnail triangular end-scraper, one sherd of Huasteca Black-on-White, two unidentified sherds, and one antler perforator or drill. This is a component of the Catan Complex. About a hundred yards south of this site, in the same bank, at a depth of eight feet below the top of the bank, was a layer of shell containing artifacts of the Repelo Complex, Site Tm c 57. Here we dug out one Abasolo Round-base, one Nogales Triangular, and one Gary Stemmed projectile point, one small plano-convex end-scraper, and flint chips.

In the Brownsville area in Cameron County, Anderson had noted that certain sites with a particular kind of culture occurred deeply buried in the banks and that the Brownsville material occurred on the top of the banks in the humus level. The five sites of the former culture were, using his numbering system, S12.7, S20.0W, S16.6W, S13.3, and S15.1C. Unfortunately, the inventory from each of these period sites was extremely small and consisted of a total of only three gouges, a plano-convex end-scraper, an Abasolo point, two Tortugas Triangular projectile points, and parts of several bifacial blades. Typologically this early material, which Anderson called the Old Cayo Complex, has been classified into my Repelo Complex.

The following table 23 indicates the correlation of the various stratigraphic information and the tentative reconstruction of the sequence of complexes on the coastal plain.

In the analysis of these archaeological materials, the various types of artifacts from levels of Tm c 29 were first compared. It became immediately apparent that the assemblage of tools from each level was slightly different. The question now became: Was each one of these a different cultural complex? To determine this,

TABLE 23

CORRELATION OF STRATIFIED COMPONENTS WITH SEQUENTIAL COMPLEXES IN NORTHERN COASTAL TAMAULIPAS (DELTA AREA EXCEPTED)

Site with stratified components	Stratified components seen on banks of arroyos			Complexes		Site with stratified components
Tm c 29	Arroyo Jimenez at Palo Alto-Repelo road	San Fernando River at Rancho Los Lidios	Carrisal Island banks			Tm c 34
Level 1	.....	.....	Tm c 56	Catan	Panuco	Levels 1–2
Level 2	.....	.....	.....	?	Las Flores	Levels 3–4
Level 3	Tm c 192	Tm c 48	.....	Abasolo		
.....	.....	Tm c 53	Tm c 57	Repelo		
Level 4	Tm c 22	.....	.....	Nogales		

we made comparisons with the other stratified materials found in the arroyo banks. It soon was apparent that Level 4 of Tm c 29 and Site Tm c 22 were very similar, and both were definitely under another complex of materials found in Level 3 of Tm c 29 and in Tm c 192. Next, the stratified components of Tm c 48 and Tm c 53 were compared with each other and then with the correlated materials from the three previous sites. Tm c 48 appeared to have the same complex as that of Tm c 192 and of Level 3 of Tm c 29. This was tentatively called the Abasolo Complex. Tm c 53 was below this complex and was tentatively referred to as the Repelo Complex. Occupying the same position was Level 4 of Tm c 29 and Tm c 22. These materials from the latter two sites were so similar to that found in the Nogales Phase of the Sierra de Tamaulipas that they were classified as such. Another site, Tm c 56, which was tentatively called the Catan Complex contained a large number of small arrow points. It lay in a bank over Tm c 57 which contained Repelo Complex material. Tm c 56 was like Level 1 of Tm c 29. Thus at this stage of our investigations the latest materials seemed to belong to the Catan Complex. These were over materials of the Abasolo Complex, which, in turn, were over two other complexes, Repelo and Nogales. When these materials were compared with the Sierra de Tamaulipas, it was found that the Repelo remains were more or less like those of the La Perra and Almagre Phases which followed Nogales, and it was assumed that Repelo occupied a similar stratigraphic position in northern Tamaulipas. A few Huastec sites, however, remained unaccounted for in this sequence. One with Huastec materials from the mouth of the Soto la Marina River was stratified, giving us two other artifact assemblages in the area, Panuco and Las Flores. Furthermore, in Cameron County and in northeasternmost Tamaulipas, many other sites existed that fitted none we had previously found. These overlay a few tools, called by Anderson the Old Cayo Complex, which could be more or less classified as part of the Repelo Complex.

The upper materials, however, were different, and we called them the Brownsville Complex. To recapitulate the stratigraphy again, the sequence was, from early to late, Nogales followed by Repelo, followed by Abasolo, which, in turn, was followed by four complexes: Catan, Panuco, Las Flores, Barril and Brownsville, all of which were more or less contemporaneous.

The next step in our analysis was to classify the single occupation sites into their correct cultural complex. This was done by comparing the artifacts of each of the single-period components with the components arranged in stratigraphic order. There was some attempt to arrange these sites in chronological order, based upon artifact trends and the general technique of seriation. Finally, when this was completed, comparisons were made with the Sierra de Tamaulipas.

In presenting these data, each artifact complex will be discussed separately. These discussions will include information on the stratigraphic position of various components of the complex, the unstratified components belonging to this complex, the traits of each complex, and their similarities and differences to the archaeological phases of the Sierra de Tamaulipas.

Nogales Phase

Stratigraphically, the Nogales materials appeared in the earliest levels of Tm c 29 under Abasolo and Catan remains. Tm c 22, a Nogales component, was also under Tm c 192, an Abasolo occupation. Other components included Tm c 30, Tm c 32, Tm c 21, Tm c 39, Tm c 169, Tm c 163, Tm c 190, and Tm c 22. Our sample of artifacts from each component was small. None of these sites had any artifacts that were different from those found in the excavated Nogales levels in the Sierra de Tamaulipas. Each site had between four and eight of the fourteen Nogales traits. The actual traits of these northern Nogales sites are as follows:

TABLE 24

DISTRIBUTION OF ARTIFACTS IN NOGALES COMPONENTS IN NORTHERN TAMAULIPAS

	Abasolo Round-base	Nogales Triangular	Tortugas Triangular	Gouge	Large Flake side-scraper	Thin Flake side-scraper	Large plano-convex end-scraper	Small plano-convex end-scraper	Disk scraper	Small chipped disks	Chopper	Ovoid blade	Square-based blade	Mortar
Tm c 30	4	1	1	1				1					1	
Tm c 29, level 4	2	1			2			1	1	1		1		
Tm c 32	2	1												
Tm c 21	2	1						1						1
Tm c 39	3	1			1	1	1	1			2			
Tm c 169	1													
Tm c 163	1				1							1	1	
Tm c 190	4							1		1		2		
Tm c 22	5				3		1			1	1	1	1	
Totals	24	5	1	1	7	1	2	5	1	3	3	5	3	1

Projectile points:

Abasolo Round-base points (previously described on p. 62).

Nogales Triangular points (previously described on p. 64).

Tortugas Triangular points (previously described on p. 64).

Scrapers:

Large flake side-scrapers (previously described on p. 75).

Plano-convex end-scrapers (previously described on p. 78).

Thin flake side-scrapers (previously described on p. 78).

Gouges (previously described on p. 79).

Disk scrapers (previously described on p. 79).

Bifacial blades:

Small chipped disks (previously described on p. 86).

Large irregularly-shaped chopper (previously described on p. 85).

Large ovoid bifacial blade (previously described on p. 85).

Large bifacial square-based blade (previously described on p. 86).

Single fragment of mortar (previously described on p. 91):

As may be seen from this set of comparisons in the chart, the Nogales Complex extends well up in northern Tamaulipas (chart 24). From what little I have seen of the excavated materials from the Falcon Dam on the Texas side, it would appear that the materials from the Royer Site in both the Felipe and Weaton tests in the uppermost terrace (called Zapata), classified as belonging to the early part of the Falcon Focus, are closely related to these materials.[21] In terms of general artifact trends, the early Falcon Focus materials, because of their larger number of Tortugas Triangular points, might be considered as being roughly equivalent to the late part of the Nogales Phase.

Repelo Complex

The Repelo Complex was one of the most numerous and widespread in northern Tamaulipas. As far as the way of life was concerned, sites of this cultural assemblage are a little different from those of the Nogales

[21] Cason, 1952.

horizon. They seem to be seasonal camps of some sort of macro-bands.

In regard to stratigraphy, one site, Tm c 57, was under Catan Complex remains, and Tm c 53 was under Abasolo materials. On the basis of seriation of traits, I would judge that the Repelo Complex comes after Nogales. There is some confirmation of this from the Falcon Dam area where the late Falcon Focus materials, somewhat like Repelo, are from the middle Rosita terrace, while the earlier part of the focus, like Nogales, is from the high Zapata terrace.[22]

Besides the two stratified sites mentioned previously, I shall briefly list the other sites of the complex. Three of these were found by Aveleyra on the Mexican side of the Falcon Dam. They are Tm c 213, Tm c 216, and Tm c 218. Four were discovered by Jack Hughes along the Matamoros–Victoria highway and are Tm c 166, Tm c 165, Tm c 164, and Tm c 167.[23] All the other sites came from the area between the Pan-American Highway and the Gulf Coast. They consist of Tm c 16, Tm c 26, Tm c 28, Tm c 47, Tm c 13, Tm c 11, Tm c 14, Tm c 36, Tm c 2, Tm c 42, Tm c 15, Tm c 23, Tm c 4, Tm c 5, Tm c 40, Tm c 20, Tm c 7, Tm c 17, Tm c 33, Tm c 10, and Tm c 19.

In terms of traits and artifacts, each site seems to be richer than those assigned to the Nogales Phase, and there are more traits for sites of this complex. These are the traits:

Projectile points:

Abasolo Round-base points (previously described on p. 62).
Nogales Triangular points (previously described on p. 64).
Tortugas Triangular points (previously described on p. 64).
Gary Stemmed points (previously described on p. 65).
Almagre Stemmed points (previously described on p. 65).
Langtry Stemmed points (previously described on p. 73).
San Fernando Stemmed points (previously described on p. 74).
Ensor Side-notched points (previously described on p. 67).
Palmillas Corner-notched points (previously described on p. 67).

Scrapers:

Large plano-convex end-scrapers (previously described on p. 78).
Large flake end-scrapers (previously described on p. 78).
Thin flake side-scrapers (previously described on p. 78).
Thick flake side-scrapers (previously described on p. 75).
Disk scrapers (previously described on p. 79).
Gouges (previously described on p. 79).

Bifacial blades:

Large disk choppers (previously described on p. 86).
Large irregular-shaped choppers (previously described on p. 85).
Large ovoid blades (previously described on p. 85).
Large square-based bifacial blades (previously described on p. 86).
Gravers (previously described on p. 86).

Ground stone:

Mortars (previously described on p. 91).
Rectangular metates (previously described on p. 93).

There are very few differences between the Repelo Complex and the Nogales Phase. Since most traits are held in common, I would suspect that Repelo was a development from Nogales. The only real differences are the large disk choppers, the metates, the gravers, the flake end-scrapers, and the Gary, Almagre, San Fernando, Ensor, and Palmillas points in the Repelo Complex. In proportions of materials, there are a few shifts. Nogales has Abasolo Round-base points dominant over Nogales and Tortugas points, while during the Repelo Phase, Tortugas and Abasolo appear in about the same proportions.

As far as the Sierra de Tamaulipas is concerned, the greatest similarities of the Repelo Complex are to both the La Perra and Almagre horizons. The traits, other than some of the projectile points and the large flake end-scrapers, can all be duplicated in both these horizons as can the Abasolo, Nogales, and Tortugas points. The presence of Gary, Almagre, San Fernando, Ensor, and Palmillas projectile points makes the horizon somewhat like Almagre, but the proportion of the points with Tortugas being very dominant makes this complex rather like Abasolo. Thus Repelo is closely related to Almagre and La Perra, and probably is roughly contemporaneous with both. This gives it a somewhat longer time span than the cultures in the Sierra de Tamaulipas, but this longer time span might be very well expected since it is being influenced less by agricultural developments from out of Meso-America.

Abasolo Complex

The Abasolo Complex follows that of Repelo. We found slightly fewer sites of this manifestation than of Repelo, but they were more widely distributed. Abasolo sites not only were sprinkled over much of the inland area but were scattered right down to the coast at the water's edge. This coastal distribution did not

[22] Krieger, personal communication.
[23] Hughes, 1947.

TABLE 25

DISTRIBUTION OF ARTIFACTS IN THE SITES OF THE REPELO COMPLEX IN NORTHERN TAMAULIPAS

Surface components	Abasolo Round-base	Nogales Triangular	Tortugas Triangular	Langtry Stemmed	San Fernando Stemmed	Ensor Side-notched	Palmillas Corner-notched	Large plano-convex end-scraper	Large flake side-scraper	Thin flake side-scraper	Disk scraper	Small plano-convex end-scraper	Gouge	Flake end-scraper	Chopper	Ovoid blade	Square-based blade	Mortar	Boulder metate	Graver	Sherds	Flexed burial in pit, no grave goods
Tm c 16	4	1	4							2												
Tm c 26	1		1			4	1		1					1				1				
Tm c 28	1		1																			
Tm c 47	1		1																		5	4
Tm c 13	1	1	1	1						2			1		1							
Tm c 11	1	1	1	2							1	11										
Tm c 14	2		1		1							1										
Tm c 36	1		1																			
Tm c 2	2		2		1					1		1	1								3	
Tm c 42	1	1	1									2										
Tm c 15	1	1	1	1?						2			1		1							
Tm c 23	1	1	1																			
Tm c 5		1				2				1												
Tm c 4		2	1									1		1			1		1		4	
Tm c 53	5	3	4		1									1							?	
Tm c 40	7	8	4					1				1			2	1			1	1		
Tm c 216	1	17	4							1	1		1		8	26						
Tm c 218	16	23	13	2						2	1	1		2	15	148						
Tm c 213		3	1											1	2	7						
Tm c 166	1	4		4			1		2	5	1					7	17		5		5	
Tm c 20	4	3	1			5	1							1								
Tm c 57	1	1		1					1			1										
Tm c 7	2					1																
Tm c 17	1			1																		
Tm c 165	2	1		1												1						
Tm c 33	7	5	1	4	2	2	1?	1		1	1		1		1	2		1				
Tm c 164	3	1		2	1				1	3			1		4	4						
Tm c 167	1			3									1			1						
Tm c 10	2	1		1											1							
Tm c 19	1			1		1				1												
Total	71	79	45	24	6	15	4	2	5	21	5	19	7	7	35	197	18	2	7	1	17	4

occur in either the Nogales Phase or the Repelo Complex. In regard to the size of sites and sort of community pattern, there is little in them that can be distinguished from those of Repelo.

Stratigraphically, the position of the Abasolo Complex is well known. Level 3 with Abasolo materials is above Level 4 with Nogales materials at Tm c 29. Site Tm c 192 of the Abasolo Complex is also above Tm c 22 with Nogales remains along the Arroyo Jimenez. At Los Lidios in an arroyo bank, Abasolo remains at Tm c 48 are over Repelo ones at Tm c 53. Also at Tm c 29 as well as Tm c 184, Abasolo remains appear below materials of the Catan Complex. Four sites, Tm c 214, Tm c 217, Tm c 212, and Tm c 215, which Aveleyra found in the Falcon Dam basin had been classified into this cutural manifestation.[24] Two of the ones Jack Hughes found, Tm c 161 and Tm c 162, also belong to this culture.[25] Eleven sites were found in Tamaulipas between the edge of the Pan-American Highway and the Gulf Coast. These were Tm c 25, Tm c 192, Tm c 3, Tm c 12, Tm c 48, Tm c 75, Tm c 18, Tm c 41, Tm c 69, Tm c 38, and Tm c 31.

[24] Aveleyra, 1951.
[25] Hughes, 1947.

TABLE 26

DISTRIBUTION OF ARTIFACTS AT SITES OF THE ABASOLO COMPLEX IN NORTHERN TAMAULIPAS

Excavated component Surface components	Abasolo Round-based points	Nogales Triangular points	Tortugas Triangular points	Matamoross Triangular points	Langtry Stemmed	San Fernando Stemmed	Ensor side-notched	Palmillas Corner-notched points	Starr Triangular points	Thick flake side-scrapers	Catan Round-base points	Thin flake side-scrapers	Disk scraper	Small plano-convex end-scraper	Gouge	Flake end-scraper	Chopper	Ovoid bifacial blade	Square-based bifacial blade	Muller	Mortar	Sherds	Graver
Tm c 192		1	1	1								1						4					
Tm c 214			2	2					1						2			9					1
Tm c 3				1		1								2						1			
Tm c 12	1	1	1	1												1	1		1			7	
Tm c 217		3	3	4?									?		2			7	?				
Tm c 212	2	10	14	7?							1	1	2	2	1	1							1
Tm c 215	1	9	9	6?						2		?	2	1	3	1		89					1
Tm c 48	1	1	4	4	1	1					2		2	1				1					
Tm c 75	2	1	2	4		1					2			1									
Tm c 18		1	2	3		1	1				3			1					1			1	
Tm c 161	3		2	3								1						10	3				1
Tm c 162	2		3									1						3					
Tm c 41	2	4	2	8		1				1	5	3			1	2			1	1			
Tm c 69	2	1	3	3					2		3			2								17	
Tm c 31	1		1	2	3	2					1	3	1		1				1		1	12	
Tm c 38	1		1	3	1	1		1							1		1					1	
Tm c 29, level 3	1		3	1		1		1		1	1	3	1	1	2		1	2					
Totals	19	32	53	53	4	9	1	2	3	4	18	13	8	11	13	5	3	125	7	2	1	38	4

Artifacts of this complex were fairly numerous, and the projectile point types give it a distinctive mien. The artifacts were as follows:

Projectile points:

Abasolo Round-base points (previously described on p. 62).

Nogales Triangular points (previously described on p. 64).

Tortugas Triangular points (previously described on p. 64).

Catan Round-base points (previously described on p. 68).

Matamoros Triangular points (previously described on p. 68).

Langtry Stemmed points (previously described on p. 73).

San Fernando Stemmed points (previously described on p. 74).

Ensor Side-notched points (previously described on p. 67).

Palmillas Corner-notched points (previously described on p. 67).

Starr Concave points (previously described on p. 70).

Scrapers:

Thin flake side-scrapers (previously described on p. 78).

Thick flake side-scrapers (previously described on p. 75).

Large plano-convex end-scrapers (previously described on p. 78).

Small plano-convex end-scrapers (previously described on p. 85).

Gouges (previously described on p. 79).

Flake end-scrapers (previously described on p. 81).

Bifacial blades:

Disk-shaped choppers (previously described on p. 86).

Ovoid blades (previously described on p. 85).

Square-based blades (previously described on p. 86).

Gravers (previously described on p. 86).

Ground stone tools:

Boulder mullers (previously described on p. 91).

Mortars (previously described on p. 91).

TABLE 27

DISTRIBUTION OF ARTIFACTS AT SITES OF THE CATAN COMPLEX IN NORTHERN TAMAULIPAS

Excavated components Surface components	Resident types											Possible resident types			Aberrant or trade objects or artifacts																		
	Fresnos Triangular points	Start Concave points	Matamoros Triangular points	Catan Round Base points	Thumbnail end-scraper	Small disk end-scraper	Small bifacially chipped disk	Thin flake side-scrapers	Ovoid bifacial blades	Choppers	Abasolo Round-based point	Nogales Triangular point	Tortugas Triangular point	Spoke-shaver	Grinding stone	Cameron Triangular points	Los Angeles points	Serrated (Toyah) points	Triangular points with a V-shaped base (Toyah points?)	Harrel points	Scallorn points	Chipped pin-like drill	Unidentified sherds	Heavy Plain	Zaquil Red	Tancol Polychrome	Tancol Brown-on-Buff	Huasteca Black-on-White Pottery	Conical columella point	Conchal shell fishhook	Rectangular shell pendant	Pierced shell disk
Tm c 29, level 1	1	5	3	1	1	1	1	6	3	2	1	2		1	1	2	1	1	2	2	1	1	6	3	1	2	1	7	1	1	1	1
Tm c 182	4	18	8	4	3	1		3	1							2	1	1		2	1		9	1	1	2	1	7	1	1		
Tm c 200, levels 1–3		1	2	1		1		1																								
Tm c 200	3	11	9	4	1	2	1	8	2	1	3	4	4						3				36	2				1	1	1	1	1
Tm c 56		1			1				1														2					1				
Tm c 43	2	2	1	1	1								3											8			1	1				
Tm c 58	1	3		1		1					1		1									1	1						1			
Totals	11	41	23	12	7	6	2	18	7	3	5	6	8	1	1	2	1	1	5	5	1	1	54	11	3	2	2	10	3	1	1	1

In terms of relationships, Abasolo shows its greatest similarity to Repelo. Many of the traits of the two complexes are the same, though there are minor differences in the proportions of different kinds of artifacts. One difference, however, is the introduction of Matamoros and Catan points in the Abasolo Complex. On the whole, there seems to be continuity from Nogales to Repelo to Abasolo in northern Tamaulipas. In terms of the Falcon Dam, these materials are very much like those found in surface collections on and in the Rosita terrace, which Krieger thought were either very late Falcon Focus or very early Mier Focus.[26] In terms of relationships to the Sierra de Tamaulipas, Abasolo most closely resembles Almagre. However the projectile point proportions are somewhat different, and it may be that Abasolo is a bit later than Almagre and is roughly equivalent in time to Laguna, Eslabones, or La Salta. The presence of Catan, Matamoros, Ensor Side-notched, and Palmillas Corner-notched points may be a horizon-marker for both northern Tamaulipas and the Sierra de Tamaulipas. If this is true, then Abasolo and the high cultures of the Sierra de Tamaulipas are of the same time period, though they are not very closely related as far as similarity of total trait complexes are concerned. Further investigation of the Abasolo material is certainly very necessary before one can speak too confidently about it.

The Catan Complex

The Catan Complex is next, with only six components, five on the coast and one inland. The way of life of the Catan people was probably not much different from that of their predecessors in the region. Subsistence was undoubtedly based upon hunting and food-gathering with perhaps more dependence upon fishing and seafood gathering than in the previous periods. The bow-and-arrow also probably made its appearance at this time. From the size of the camp-sites, I would surmise that they were grouped in semi-nomadic micro-bands and probably spent the spring months inland gathering food and the rest of the year along the coast living off the sea.

Since three components were stratified, this complex can be placed in its correct temporal position. Level 1 of Tm c 29 was above Abasolo and Nogales remains. Tm c 200 was above a stratum with a few Abasolo tools, while Tm c 56, with Catan tools, was in a stratum above Tm c 57, which was of the Repelo Complex. Other sites were Tm c 43 and Tm c 58. Along the coast, a number of small sites which probably belong to this complex yielded practically no artifacts. We have only a limited number of tool traits.

Projectile points:

Starr Concave projectile points (previously described on p. 70).

Matamoros Triangular projectile points (previously described on p. 68).

Fresnos Triangular projectile points (previously described on p. 69).

Catan Round-base projectile points (previously described on p. 68).

Scrapers:

Thumbnail end-scraper (described on p. 190).

Small Round Plano-convex end-scraper (previously described on p. 85).

Thin Flake side-scraper (previously described on p. 78).

Spoke shaver (previously described on p. 79).

Bifacial blades:

Small chipped disk (previously described on p. 88).

Ovoid blade (previously described on p. 85).

Irregularly-shaped chopper (previously described on p. 85).

As yet, it is not possible to discern exactly out of what the Catan Complex developed. Perhaps it was ultimately derived from the Abasolo Complex or something like the second level of Tm c 29. Relationships in space are, however, easier to recognize. Panuco Period (VI) sherds on the surface of four of the six sites of this complex point to a connection with the last prehistoric period of the Huastecs. Further, the finding of the same combination of points, Matamoros Triangular and Starr Concave, in both Catan and Panuco Period (VI) tends to confirm such a connection. This same projectile point complex, along with the small plano-convex end-scrapers, the presence of a shell fish-hook, a square shell pendant, a rectangular shell pendant, a columella point, a Cameron Triangular point, and a shell scraper from Catan Complex sites, would seem to indicate a connection northward along the coast to the Brownsville or Barril complexes, where all the above-mentioned artifacts appear in some abundance. The presence in both the Los Angeles Phase and the Catan Complex of Starr Concave, Fresnos Triangular, Matamoros Triangular, Catan Round-base, and Los Angeles Concave projectile points, of disk scrapers and small chipped disks as well as big blades and flake side-scrapers suggest at least a temporal connection between the latest aboriginal culture of the Sierra de Tamaulipas and the latest in Central Tamaulipas. From what little I know of the Mier Focus of the Falcon Dam area, it also seems very closely related to the Catan Complex if not actually the same.[27] However, before such a nexus can be established, one will have to have the detailed description of traits of the Mier Focus.

[26] Suhm and Krieger, 1954.

[27] Suhm and Krieger, 1954.

TABLE 28

DISTRIBUTION OF ARTIFACTS AT SITES OF THE LAS FLORES AND PANUCO PHASES IN NORTHERN TAMAULIPAS

Phase	Excavated components Surface components	Resident types																				Aberrant Types									
		Fresnos Triangular point	Starr Concave point	Matamoros Triangular point	Metate fragments	Obsidian lamellar flake	Unidentified sherds	Sherds with Panuco Period (V1) vessel forms	Huasteca Black-on-White sherds	Tancol Brown-on-Buff sherds	Tancol Polychrome sherds	Tancol Black-on-Red sherds	Zaquil Red sherds	Panuco Heavy Plain sherds	Panuco Gray sherds	Las Flores Red-on-Buff sherds	Las Flores Black-on-Red sherds	Las Flores, molcajete fragments	Zaquil Black	Las Flores Relief sherds	Las Flores incised sherds	Ovoid stone pendant	Ovoid bifacial blades	Abasolo Round-base point	Tortugas Triangular point	Nolan Bevelled stem point	Keechi (Toyah) point	Alba Barbed point	Winged drill	Totonac sherd	Morbiss Stemmed point
Panuco	Tm c 34			1	1	1	22	17	3	6	4			7		1					3										
	Tm c 34, levels 1–2				1		31	4	5	5	15	1	11	8								1									
	Tm c 184, level 1		3	2	1		41	2	8	1	3		12	17	3		2	1						1							
	Tm c 184, levels 2–3			2			2		1		4		4	8	1		1										1				
	Tm c 306	1	2		x	1	171	8	13	2	14		2																		
	Tm c 307		1		x	4	42	9	12				41	3	3					1											4
	Tm c 73, level 1								2		1		2																		
	Tm c 74						7		3	3	2		8	20													1		1		
	Tm c 71	1	4	3			4		10	4	6		14	21																	
	Tm c 72	2	1	3			4		11	1	38		10	4				2									1				
Las Flores	Tm c 73	1			1		38		8	1	1		18	25	1	2		7		1	2			2						1	
	Tm c 34, levels 3–4				1		10						12	12	1	4	2		1	1	2		1	1		1					
	Totals	5	11	11	5	6	372	40	68	23	88	1	134	125	9	7	5	10	1	3	7	1	1	4	1	1	3	1	1	1	4

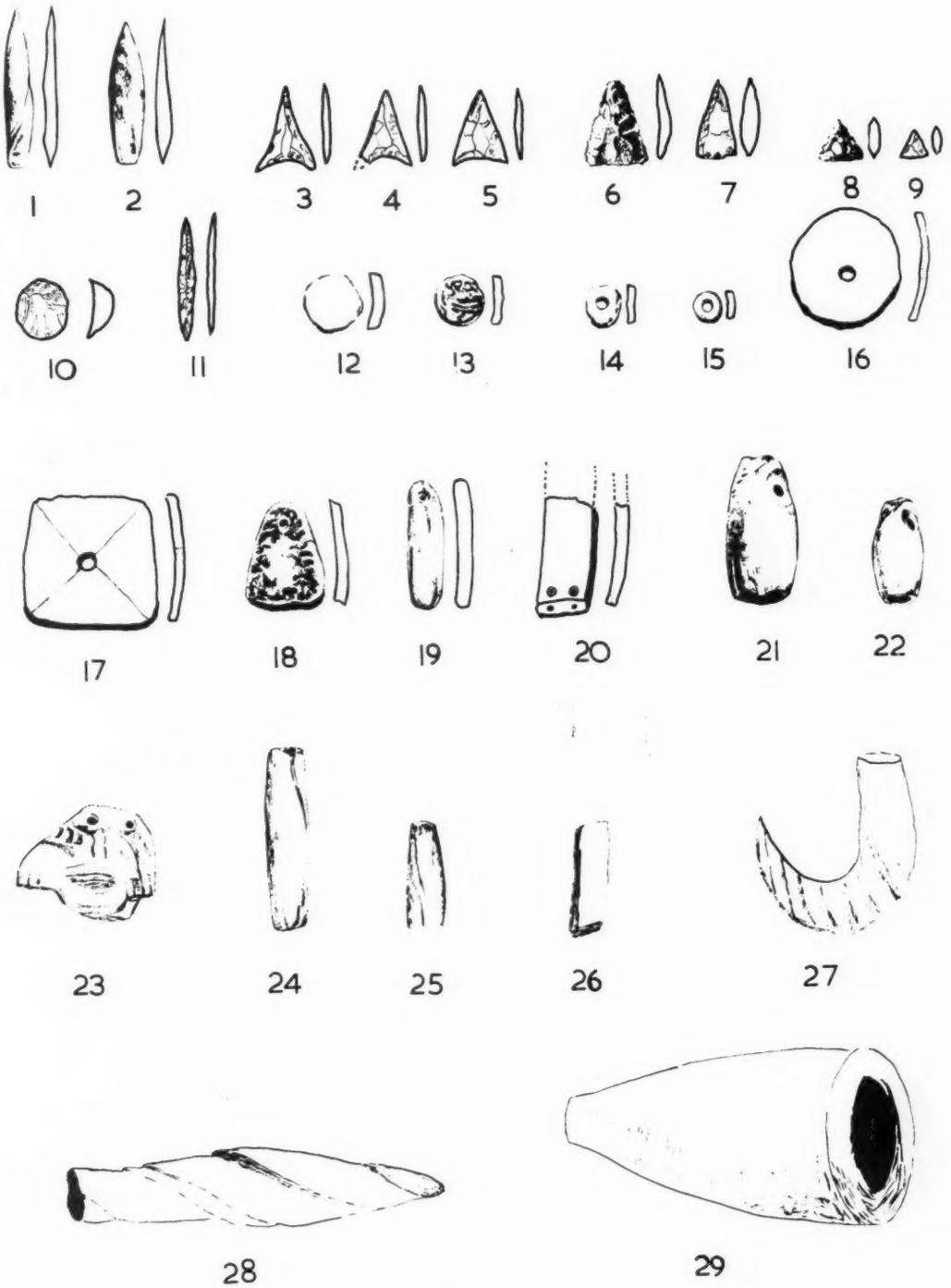


FIG. 51. Barril and Brownsville Complexes artifacts (1/2 natural size and mainly from sites Tm c 119 and S 02.5). 1. Conical Columella point. 2. Conical bone point. 3–5. Brownsville Concave (chipped stone) projectile points). 6–7. Matamoros Triangular (chipped stone) projectile points. 8–9. Cameron Triangular (chipped stone or glass) projectile points. 10. Small plano-convex flint scraper. 11. Chipped flint pin-like drills. 12–13. Shell disks. 14–15. Perforated shell disks. 16. Round shell pendant. 17. Square shell pendant. 18. Triangular shell pendant. 19. Rectangular shell pendant. 20. Long rectangular shell pendant. 21–22. Oliva shell tinklers. 23. Mollusc shell pendant or scraper with engraved decoration. 24. Columella tubular bead. 25. Columella plug round in cross-section. 26. Columella plug square in cross-section. 27. Conch shell fishhook. 28. Columella gouge. 29. Conical pumice pipe.

Panuco–Las Flores Complexes

Sites of these two complexes are found along the Tamaulipas coast north from Tampico as far as the San Fernando River. All of them are, at least in part, shell mounds, and they tend to be smaller as one goes from south to north. Two of them in the south, Tm c 306 and Tm c 307, have a number of mounds and a few ball courts with them, as well as occupational refuse and shell. Since all their pottery types and all their other traits are identical to those found in the Panuco and Las Flores periods of the Tampico–Panuco region, I have assumed that these are Huastec sites. As there are a few metates at each site besides the large amounts of shell and fish bones, it looks as though they engaged in some agriculture.

None of these sites was found in a stratigraphic position with other complexes in the area. However, at Tm c 34 Panuco sherds appeared above Las Flores sherds. The only way that relationships may be established with other complexes in the local region is on the basis of trade or similar material. Since Mier, Los Angeles, Catan, Barril, and Brownsville assemblages all have the same projectile point complex as these Huastec sites, they would seem to be distantly related and roughly contemporaneous. Furthermore, each of these (except Mier) has some Huastec trade sherds. Another interesting feature of these Huastec sites is the presence of a few trade objects from considerable distances. These include a Totonac sherd, probably from central Vera Cruz; a Nolan Bevelled-stem projectile point, an Alba point, a Keechi Concave projectile point, and a winged flint drill, all from central Texas. The presence of Spanish glazed sherds and fragments of metal on many of the sites indicates some historic contact. Primarily the metal objects were fragments of brass and copper. A number of these were analyzed, and most of the so-called copper is probably brass, but two pieces of copper were unlike native Mexican copper in that they contained a fair amount of silver impurities. As all the traits of this complex have been described in Ekholm's 1944 report, I have not attempted to list them, but have included them in a trait list accompanying this section (table 28).

The Barril and Brownsville Complexes

Along the coast north of the Catan ecological zone is the Washington Beach zone in the delta of the Rio Grande. The western border of this zone runs from about Santa Teresa northward to Matamoros and then seems to run northeast, hitting the Gulf of Mexico at the north border of Cameron County, Texas, while the eastern border is the Gulf of Mexico. It is fundamentally an area of coastal flats covered with a prairie grass vegetation. A number of small streams and *resacas* as well as a series of lakes and basins representing dried-up lakes cut across it.

Ethnologically and linguistically the peoples of this region have been linked with those further up the Rio Grande and in central inland and coastal Tamaulipas. As I shall point out, the material culture of the peoples of the Rio Grande Delta at historic and late pre-historic times is very different from that of the peoples of the Sierra de Tamaulipas, though on an earlier time level it seems connected. This area is important to our study of the cultures of the Sierra de Tamaulipas for a number of reasons. On a late pre-historic and historic horizon, in spite of many differences there seem to be a few cultural similarities between the late Rio Grande Delta cultures and the Los Angeles Phase, and the former are well linked with the last two Tampico–Panuco Huastec periods.

Some of the archaeological material of this region has been known for a considerable length of time and has been described piecemeal for the last twenty years. The articles that have been written on these materials consist of a paper by Mason on Huastec pots in a Brownsville Complex site,[28] one article by A. E. Anderson on the artifacts of the area,[29] and a summary of the culture complexes by Sayles.[30] Unfortunately, in none of these is there a complete inventory of the items of the culture complexes or an adequate description of their temporal position or their cultural relationships. In my description of the complexes, therefore, I shall attempt to correct these oversights and present some concrete conclusions based upon actual site-by-site analyses and correlations.

The majority (268) of the sites of the Delta region seems to belong to one or two closely-related complexes. Originally I felt that all these sites belonged to a single complex called the Brownsville Complex.[31] However, in 1948 Dr. T. N. Campbell of the Department of Anthropology, University of Texas, pointed out to me that there were a few artifact differences between the sites in Cameron County of Texas and those from northeastern Tamaulipas. Hoping to determine either chronological or spatial differences, I then began a reanalysis of these materials.

Since most of these sites yielded samples of artifacts that were too small to allow for seriation and lacked any sort of foreign materials that would give a clue about chronology, the first task was to cull out the good sites. Of the 268 sites from which we had materials, only 52 yielded enough to work with. The trade materials from these 52 good sites were examined (table 29) and segregated into three chronological periods. The latest period was characterized by wheel-made or glazed sherds and/or small triangular projectile points of bottle glass, all of European origin. Eight sites had materials of

[28] J. A. Mason, 1935.

[29] A. E. Anderson, Artifacts of the Rio Grande Delta Region, *Bull. Texas Archaeol. and Palaeontol. Soc.*, Abilene, **4**: 29–31, 1932.

[30] Sayles, 1935: table 5.

[31] MacNeish, 1947.

TABLE 29

DISTRIBUTION OF ARTIFACTS AT SITES OF THE BARRIL AND BROWNSVILLE COMPLEXES IN THE DELTA AREA OF TAMAULIPAS

Phase complex	Surface components	Resident types																																		
		Pierced whole conch shell	Small snail shell beads	Conical pumice pipe	Bivalve beads	Marginella beads	Conch shell fishhook	Cameron triangular (flint) Projectile point type	Shell plugs, rectangular in cross-section	Chipped pin-like drills	Columella gouge	Oliva shell tinklers	Triangular shell pendants	Oliva shell beads	Small plano-convex (flint) End-scraper	Perforated shell disk	Shell disk	Shell plugs, round in cross-section	Fresnos Triangular projectile point type	Starr Concave projectile point type	Matamoros Triangular projectile point type	Mollusk shell scraper	Rectangular conch shell pendant	Square shell pendant	Conical columella projectile point	Columella tubes	Chipped pebble hammerstone	Flexed burial in pit, no grave goods	Split bone awl	Round shell pendant	Long rectangular shell pendant	Conical bone projectile point	Pitted stones	Antler perforator
Brownsville	Cameron Co. S 02.1			1								2		4	1			1	2		1														
	Cameron Co. S 14.9							1				1			4	2	6	1	1		9						2								
	Tm c 103							5		2		1		2	1		6																		
	Cameron Co. S 02.2			1				2				3		11	4		1		2	6	2														
	Cameron Co. S 01.0							1				1			1				1			2	2													
	Cameron Co. S 11.4	1						1						1	2	1	1			1		2													
	Cameron Co. S 19.9				15	9			2			1		5	4	3	4		1	2		4	1												
	Cameron Co. S 16.5		1			1		1						3	6	4	8	2	1	1	1	3	1												
	Cameron Co. S 02.10			1								2	4		1			1	1			1													
	Cameron Co. S 02.8								1			1				2	3	1	1	1			1				2								
	Tm c 144							1				1						1	1	1	1		1?	1											
	Tm c 93							1																1				1							
	Cameron Co. S 00.9										1	1									1	2													
	Cameron Co. S 00.5	1						18		1	3	16		11	14	4	3		3	13	1	9		3	1?									
	Cameron Co. S 15.2			1				3			1	3		4	3	3	4		7	1	3	2	2		1?	1								
	Cameron Co. S 02.5		54	4	26	4	1	22	2	2		6	5	24	29	35	43	13	29	61	11	29	3		2	2								
Barril	Tm c 91							1	1	2		2		1	3	39	93	3	1	3	4				16	2				5	2		2	
	Tm c 68											2				39	4			4			2		22	2								
	Tm c 66							1	1?			4	1	1		5	5		1	4	3		1		14	1		1		1				
	Tm c 52							1				1	3			8			1	2			1	1	9	2								
	Tm c 123							1								5	11	1?		1	2				7	2	3							
	Tm c 111							1	1			3		3		5	13					3	1		14		2				1		2	
	Tm c 120							4		6	1	2	2	4	5	2	5		8	4	3	x	3		7	1	8		1		1		1	
	Tm c 97						1?		3	1		2					4		2	4	4	3	1		1	1								
	Tm c 119					2		3	2		1	4	1	1		25	28		8	4	2	22	5		28	1		3	2		3	5	1	1
	Tm c 63							1					1			1							1		6	1		1					1	
	Tm c 145									1							7				1	5		2	2	1				1				
	Tm c 101							1?			2	1			3	2	7		5	2		1			1			1		1				
	Tm c 154									2					1	8	29		4	2	2	5			15	2				1				
	Tm c 127										1	3				12			2										1	1				
	Tm c 124											7	1	1		3							9	2	1	3								
	Tm c 117											1		5			7		3			9			2	1	5			1				
	Tm c 139											2	1		3	3	16		3	5	1				4			2	1	2				
	Tm c 121			1?						1		6	1			120	63	1	7	7	5	2	2	1	64	5		4		14	7			
	Tm c 107											1		1		8			1			2	1		7					1				
	Tm c 135										1?					2	5				1				5					1				
	Tm c 155										1		1		3		8		4	6	2	2			2	1				1		4		
	Tm c 149											1				4	6		2	1	2	1	1		3			1						
	Tm c 118									1		2		1			5			1	1		1				6				1			
	Tm c 148											2	2		2	2			4	3	2	5			12	1								
	Tm c 136											1			11	11	11				4				27		1			1				
	Tm c 146											2				15	1	1	1	1	2	1			27					3	1	2	1	
	Tm c 156											2				30	19		1			5	2		40	5		1						
	Tm c 137												1			3	15			2	5		1		18	2	2	2	1		1	1		
	Tm c 153												2		2	10	20		1	1	5				4	1	3			1	1	1		
	Tm c 134															5	6	1		1	3				14	1				1				
	Tm c 92														1		1	3		1	1	2			1	1	1							
	Tm c 147													1		5	8	1	2		3	3			1	1		2						
	Tm c 115													1		4	5			1	3	1	1		4				1					
	Tm c 1333														1?	1	7				2				21	1								1
	Tm c 106															1	1		1		1					1				1				
	Tm c 108															3	16				1	6			7	2	1			2				

TABLE 29—*Continued*

| Phase complex | Surface components | Aberrant artifacts | | | | | | | | | | | | | | | | | | | | | | Trade artifacts | | | | | | | | | | | | | | | | | | |

this type and were considered to be late sites that existed during historic times. The next period was characterized by herds of the latest period of the northeastern Huasteca (Panuco Period VI) and were as follows: Tancol Polychrome, Huasteca Black-on-White, Tancol Brown-on Buff, Zaquil Red, Heavy Plain, molcajetes of the Panuco Period (VI).[32] Eleven sites had trade materials of this period. The earliest period's diagnostic characteristics were sherds from the northeastern Huasteca of the Las Flores Period (V), which were: Zaquil Red, Las Flores Fine Paste, Las Flores Relief, and Panuco Grey.[33] Five sites had traits of this period. In this way it was possible to line up in chronological order 22 of the 52 sites in the Brownsville area that had adequate samples. (Incidentally, two sites had traits of both the late and middle period.)

With twenty-two of the sites thus arranged in a rough chronological scheme, I then turned to the study of the artifacts at these key sites to see whether they, or a class of artifacts, could not also be ordered. A study of the artifacts revealed that there were thirty-one different kinds that appeared fairly consistently at most of these sites and seemed to have some chronological significance. The ordering and refining of these trial types was done by means of a large correlation chart. The abscissa of this chart was the sites ordered from early to late (left to right) on the basis of the trade materials. The ordinate of the chart was the traits or trial types arranged from top to bottom as late to early. The tabular values were the number of each type at each site. The traits seemed to fall into a number of categories from top to bottom, or late to early, that are as follows: At the top, and the latest, were seven types that appeared only or mainly in the latest period associated with historic goods. Next were seven traits that appeared at both sites with historic goods and with Panuco Period (VI) sherds; and still earlier, and below these on the chart were three traits that appeared only at sites with Panuco (VI) pottery. Still lower on the chart were eight types that appeared at sites of all three periods, while lowest on the chart were seven types that appeared at sites with Panuco Period (VI) or Las Flores Period (V) sherds.

After this, the other thirty sites and their traits were inserted, on the basis of seriation, into appropriate positions on the chart (table 29). This series of manipulations not only revealed the approximate chronology of the sites but also indicated the cultural changes, trends, additions, and inventions. It also indicated that there were two closely related culture periods or cultural complexes.

Linking these two cultural complexes, which I have called the Barril and Brownsville Complexes, were seven types which are as follows: shell disks and pierced shell disk beads, plugs made from a columella that are round in cross-section, rectangular conch shell pendants, mollusc shell scrapers, and Starr Concave, Fresnos and Matamoros Triangular projectile points. At most sites these seven traits included the most numerous artifacts encountered. Another trait of less importance, which seems to tie the two periods, is that of flexed burials, usually without grave goods, in round shallow pits.

Types that seem to be diagnostic of the earlier Barril Complex are the following: antler perforators, pitted stone anvils, long narrow rectangular conch shell pendants, chipped pebble hammerstones, tubular beads made from a columella, columella projectile points, bone points, split-bone awls, round shell pendants, and triangular shell pendants. Sites of the Barril Complex are mainly situated in northeast Tamaulipas; only two have been found in Cameron County, Texas.

Types diagnostic of the later Brownsville Complex were: Pierced whole conch shells, small snail shell beads, conical pumice pipes, bivalve beads, Marginella beads, conch shell fishhooks, Cameron Triangular projectile points, chipped pin-like drills, shell plugs with rectangular cross-sections, and columella gouges. Almost all the sites of this complex appeared in Cameron County, Texas.

In the following pages I have listed and described the trait complex of the Barril and Brownsville Complexes. The peoples seem to have been basically nomadic, subsisting upon fishing and seafood collecting along the Gulf and in the nearby small lakes and streams. To a lesser degree they may have collected plant materials and hunted. The size of their projectile points reveals that they used the bow-and-arrow. The population must have been small, being made up of a series of bands, who seem to have had widespread contacts with their neighbors. A few burned human bones reveal some cannibalism. The camp-sites, usually with a single fireplace, give no indications of any sort of house. The humerus skin scrapers reveal that they probably prepared hides. Burials are flexed.

Projectile points:

Matamoros Triangular projectile points (previously described on p. 68).

Fresnos Triangular projectile points (previously described on p. 69).

Starr Concave projectile points (previously described on p. 70).

Cameron Triangular points.

These points are usually made of chert, but a few are of bottle glass. In shape they are commonly equilateral triangles about 7 to 15 mm. wide and 8 to 13 mm. long. They are made from a thin flake and have retouching along both sides of all edges.

They also are found in the Rockport Focus of the Corpus Christi region, and a few occur in the Catan Complex of the central Tamaulipas coast. One of the broken Los Angeles points may be of this type. In the

[32] Ekholm, 1944: 364–365.
[33] *Ibid.*, 358–364.

Delta region they are confined to the Brownsville Complex.

Conical Columella points:

Of these points, 435 were examined; they appeared at thirty-three of the thirty-six Barril Complex sites. They are made from the columella of a large conch shell. The columella has been ground so that the points are round in cross-section (7 to 20 mm. maximum thickness), and one end has been ground to a long, narrow, conical point. The opposite ends are, however, ground flat on two opposing sides, giving the points a wedge-shaped base. They are between 25 and 75 mm. in length, and the wedge-shaped base is usually between 5 and 20 mm. in width.

As far as I have been able to determine, these points are unique to the Barril Complex, and I would suppose they were used as arrow or spear points or as drills.

Conical bone projectile points:

Only twenty of these were examined. They occur at only eight Barril sites. In size and shape they are identical to the Conical Columella projectile points and are unique to the Barril Complex.

Scrapers:

Small plano-convex flint scrapers: These small scrapers are round (10 to 40 mm. in diameter) with a flat ventral surface and convex dorsal surface. They are between 3 and 8 mm. thick. The dorsal surface bears irregular chipping at the centre and fine retouching along half or all of the edges.

At historic times this type occurred all along the coast from Tampico to Corpus Christi and in the Catan Complex and Los Angeles Phase in inland Tamaulipas.

Mollusc shell scrapers: About two hundred of these were examined. They occurred at nineteen Barril sites. These are usually mussel shells whose edges bear a series of wear scars indicating that they were used as scrapers. Often there are two small holes near their fulcrums.

These occur in the Brownsville Complex, and are found in the Aransas and Rockport Foci of the Corpus Christi region.

Columella gouges: These are rare in Barril Complex sites and appear mainly in the later Brownsville Complex. They are rough columella which show grinding on one side at one end.

These occur in the Rockport and Aransas Foci of the Texas coast as well as in the last two complexes of the Rio Grande Delta area.[34]

Ground and pecked stone:

Chipped pebble hammerstones (previously described on p. 86): These are mere river pebbles that show considerable battering. Though this is a very general sort of trait, it seems to be absent from the Brownsville Complex and present in Barril.

Pitted stones or anvils: A series of small flat rocks with one or more depressions pecked into them comprise this type. Like the previous trait, they are a general type not found in the Brownsville Complex, though they occur in Barril.

Perforating tools:

Antler perforators (previously described on p. 94): Antler tines with evidence of use or polish occur at a few Barril sites. They do not occur in Brownsville sites.

Split bone awls (previously described on p. 94): Deer ulna and other deer bones have often been polished to form a point. They are not common in Barril sites and are absent from Cameron County, Texas, sites.

Flint pin-like drills: They appeared at seven sites of both the Brownsville Complex and the late sites of the Barril Complex. They are between 22 and 50 mm. in length, are more or less round in cross-section, have a maximum diameter of between 3 mm. and 10 mm., and are pointed at both ends. They are chipped on all sides.

These drills are unique to the Barril and Brownsville Complexes.

Conch shell fish-hooks:

These occurred at only one site of the Brownsville Complex. They are made from a conch shell, have a maximum width of about 10 mm., and are about 60 mm. long. They are in the form of a "C."

These are found in the Huasteca [35] and in the Rockport Focus of Texas.[36]

Ornamental Complex:

Shell disks (previously described on p. 94). About 525 of these were examined, and they occurred at forty-one of fifty-two Barril and Brownsville sites. They are made from conch shells, which have been chipped and/or polished to a disk form. Their diameter ranges in size from about 25 to 50 mm.

They are also in the Rockport Focus of Corpus Christi, Texas,[37] and they occur in the Tampico–Panuco region in the Las Flores Period (V) and Panuco Period (VI)[38] as well as in the Catan Phase on the central Tamaulipas coast.

Perforated shell disks:

In the collections 467 of this type occurred. They were present at thirty-seven of the fifty-two sites here

[34] T. N. Campbell, 1947: 53–54.

[35] Ekholm, 1944: fig. 52, *c, d* F 1.

[36] Sayles, 1935: table 5.

[37] Sayles, 1935: table 5.

[38] Ekholm, 1944: 482.

considered. Except that they have a central perforation, they are identical to the shell disks in size, shape, and areal distribution.

Round shell pendants:

These range from about 25 to 130 mm. in diameter and have a central hole, often notched edges, and occasionally engraved lines. They are always made from conch shells.

They occur only in the Barril Complex, though I have seen similar ones from the Huasteca.[39]

Rectangular shell pendants:

Occurring at twenty-three of the Barril and Brownsville sites are rectangular shell gorgets made from conch shells. They range from about .8 to 2.4 inches wide and are between 25 to 100 mm. long. Edges have been ground smooth, and on a few the corners have been slightly rounded. Piercing occurs at one or both ends, and occasionally two holes are found at both ends.

Pendants of this type also are found in the late periods in the Huasteca.[40]

Long rectangular shell pendants:

This type is more rare than the other and is confined to the Barril Complex. These are usually made from a thick piece of conch shell and are between 90 to 175 mm. long and 18 to 45 mm. wide. Superficially they look like a section of deer-rib. Piercing is usually near one end, and in many cases the piercing (usually two holes) runs obliquely from one surface out the end of the pendant.

Triangular shell pendants:

These are common in the Barril Complex, but they also occur in the Huasteca in the Las Flores Period (V) and Panuco Period (VI).[41] Unlike those in the Huasteca, the Barril pendants do not have engraving.[42] They are made from a conch shell and are triangular in outline. They range in size from 50 mm. wide and 80 mm. long, to ones 100 mm. wide and 260 mm. long. Holes usually appear at the base of the triangle: there may be one at each corner, two at each corner, one in each corner and one in the centre of the base, or one only in the centre of the base, and a few have three holes, one in each corner.

Square shell pendants:

These appear in Brownsville Complex sites and some of the later Barril sites. The square conch shell pendants range in size from 22 by 22 mm. to 75 by 75 mm. Usually there is a single central hole, but a few have holes at two corners or all four corners. Three of these have engraved crosses on them, and one has a cross inside a circle.

Oliva shell tinklers:

These tinklers occur in the late Barril sites and most of the Brownsville sites. They are made from an Oliva shell that has had one end cut off and the other end perforated by a slit or round hole.

Ornaments such as these appear in the Huasteca in the Las Flores and Panuco Periods,[43] and they occur in the Rockport Focus of the Corpus Christi region.[44]

Oliva shell beads:

They have the same distribution as the above types and are the same, except that one end has not been cut off.

Columella tubular beads:

These occur mainly at Barril Complex sites and in the late periods of the Huasteca.[45] These beads are made from a columella that has been ground round (between 11 and 22 mm. in diameter) and then pierced lengthwise. They range from 4 mm. to 100 mm. long.

Columella plugs, round in cross-section:

These occur in both the Barril and Brownsville Complexes. They are the same as the tubular beads, except that they have not been pierced lengthwise.

Columella plugs, square in cross-section:

These objects appear in the Brownsville Complex and in a few of the late Barril sites. They are usually ground so that they are square in cross-section (8 to 25 mm. wide) and range from 7 to 40 mm. long.

Conical pumice pipes:

These pipes are conical in shape with convex surfaces. They are about 150 mm. long, and the narrow ends are 13 to 33 mm. wide, while the other end is from 30 to 60 mm. wide. A central hole about 10 mm. wide has been drilled lengthwise through them. They occur only

[39] Ekholm, 1944: 482.

[40] Ekholm, 1944: beads on p. 482.

[41] Ekholm, 1944: p. 481.

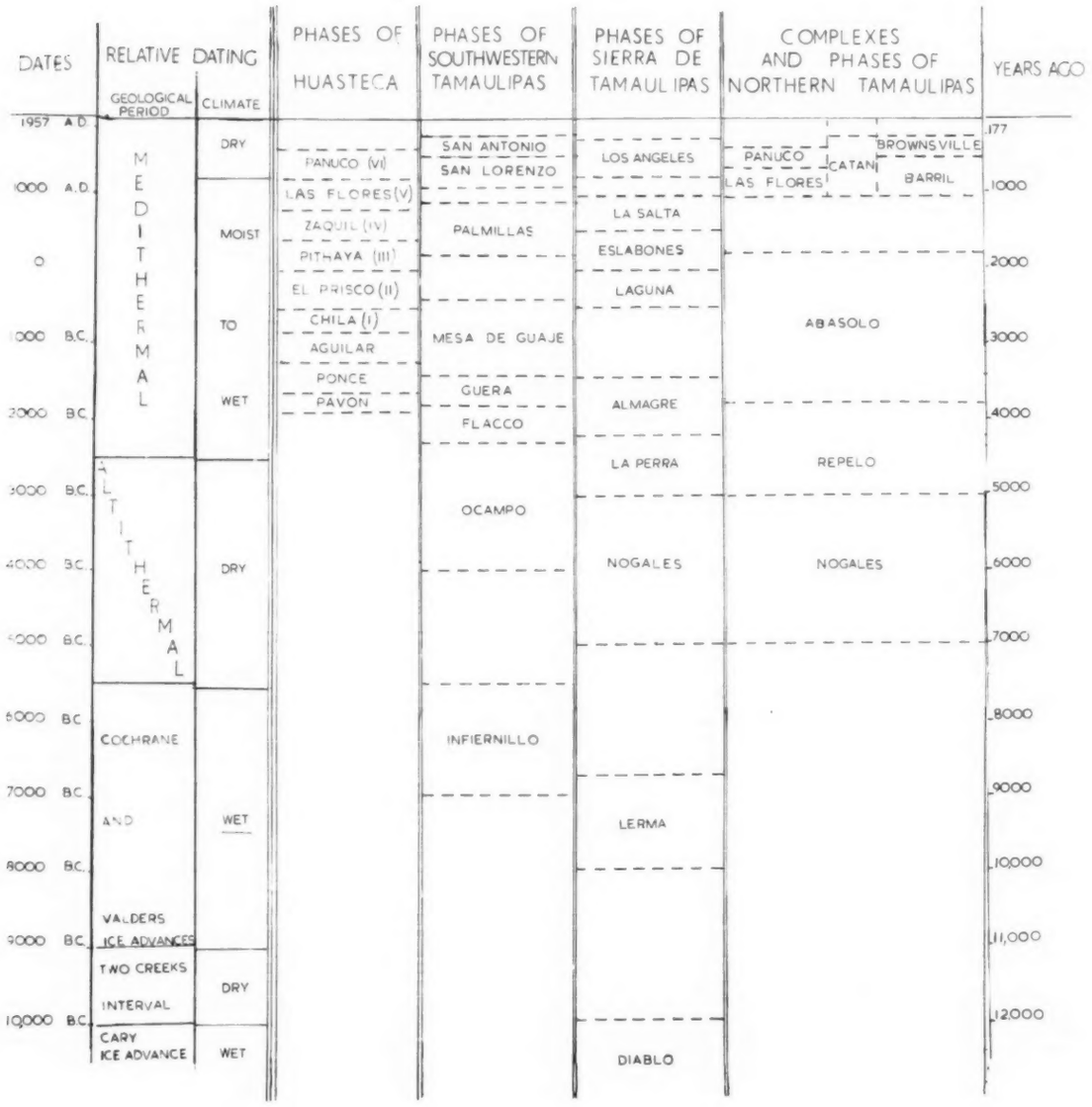
[42] This statement is true, with the possible exception of one pendant given to Anderson as having been found in Cameron County, Texas. This pendant was broken in two, and all that remains is the basal half of a triangular gorget. It was made from a conch shell and decorated with a full-faced view of a human head carved in relief. A roll, which may be a snake, frames the face, and rising from the head are two incised lines which cross, become wavy, and form into five or six small lines at their extremities. This may represent an outer headdress. Hanging from the ears are two thick round earrings. Two holes appear at the basal corners. I suspect this is a Huastec gorget, traded into the area.

[43] Ekholm, 1944: fig. 52, *p–u*.

[44] Sayles, 1935: table 5.

[45] Ekholm, 1944: fig. 52, *l–m*.

TABLE 30



in Brownsville. These also occur in the Rockport [46] and Aransas Foci of the Texas Gulf Coast.[47]

Burial Complex:

Burials of these complexes are usually flexed and in shallow pits near or in camp-sites. For the most part they are without grave goods. However, several have with them a few beads or pendants, and a number have whole Huastec pots (Panuco Period IV).

In regard to relationships, the projectile points and small scrapers of Barril and Brownsville link them with Los Angeles. Furthermore, the Panuco Period sherds in Brownsville and Los Angeles put them on the same time horizon. The presence of Las Flores sherds in some sites of the Barril Complex seems to show that it is of a slightly earlier period. Generally speaking, the Brownsville and Barril Complexes, because of their shell industry, are very specialized and do not seem directly related or ancestral to any complexes in Tamaulipas. However, Catan, Mier, Brownsville, Barril, and Los Angeles may all have been ultimately derived from something like Nogales. If so, then each went through a separate and distinct development.

[46] Sayles, 1935: table 5.
[47] Campbell, 1947: 59.

SUMMARY OF COMPARISONS

The Diablo Complex of the Sierra de Tamaulipas, because of its meagre inventory, cannot be related to any other cultural horizon. Lerma, with a somewhat larger group of traits, is equally difficult to link with other cultural complexes. The Lerma points do seem to be analogous to ones found in early complexes in Latin America, namely at Itzapan II in the Valley of Mexico at the El Jobo site in Venezuela, at Huancayo in Peru, and at the Early Fishhook culture of northern coastal Chile. Total industries, however, between these five complexes differ considerably. One industry, Infiernillo, in southwest Tamaulipas has a vague resemblance to Lerma in terms of total complexes.

Starting with Nogales, there is evidence of a widespread tradition in Tamaulipas. Not only are Nogales artifacts and sites scattered over much of Tamaulipas but the complex as a whole seems related to materials from the Early Falcon Focus in the Falcon Dam Basin of Texas and Tamaulipas, as well as Early Ocampo in southwest Tamaulipas. Some of the tools from de Terra's vaguely defined "Chalco" Complex (particularly those from the Rio Verde of San Luis Potosí) seem connected with Nogales. However, one must await more information on Chalco before a nexus can be established.

La Perra is related to Late Ocampo remains from southwest Tamaulipas, Repelo remains from northern Tamaulipas, and possibly the middle or late part of the Falcon Focus of northwest Tamaulipas. Although Tortugas points, a diagnostic of La Perra, are widespread in central Texas, the complexes as a whole do not seem to be closely linked.

Almagre has a definite similarity to the Flacco Phase of southwestern Tamaulipas. It also has some similarities to the Repelo and Abasolo Complexes of northern Tamaulipas, and is possibly related to the Late Falcon Focus or earlier Mier Focus in northwest Tamaulipas. The Gary and Almagre Stemmed points of Almagre show a connection with the Pecos River Focus of the Big Bend area of Texas and the Ciengas Complex of Coahuila as well as a series of foci in Texas. However, the artifact complexes as a whole do not seem connected.

Laguna affiliations point southward. Mesa de Guaje of southwestern Tamaulipas is distantly related to it, while the El Prisco (II) horizon of the Tampico–Panuco region has many traits in common. As pointed out previously, El Prisco has relationships with a host of late Formative phases throughout Meso-America.

Eslabones, on the basis of traits, seems related to Pithaya (III) in the Tampico–Panuco region as well as early Palmillas in southwest Tamaulipas. La Salta relationships are to the same areas, namely, to Zaquil (IV) in the Tampico–Panuco zone and to late Palmillas in the Sierra Madre of Tamaulipas.

Los Angeles seems to be closely related only to San Lorenzo and San Antonio of southwest Tamaulipas. Trade sherds and a host of small arrow points link it with the Mier Focus, Panuco, Catan, Barril, Brownsville, and late sites in Texas, but other traits are very different

In terms of the general directions of relationships: Lerma and Nogales affiliations may be southward; La Perra and Almagre linkages are westward and to the northwest; Laguna, Eslabones, and La Salta may be connected with cultural developments further south, while Los Angeles seems to be a very local manifestation with its main ties in a westerly direction.

3. RELATIVE AND ABSOLUTE DATING OF THE SIERRA DE TAMAULIPAS SEQUENCE

In the previous sections the stratigraphy of the various sites, the artifact trends, correlation of the stratigraphies of the various sites, and the affinities of the various congeries have been discussed; from these considerations it was possible to arrange the phases into a relative chronological scale.

Now let us turn to the problem of dating more exactly various parts of the sequence. First we shall consider the historic evidence. Saldivar has placed the Pasitas tribe in the Canyon Diablo at the time of the conquest of Tamaulipas, 1746 to 1790. Documents in Villa Casas, Cabacera de Municipio for the Sierra de Tamaulipas region, indicate that the final group of Pasitas was exterminated by the Jaumave in 1780 at their village near the Mission at Los Angeles. There is considerable evidence to show that the Los Angeles Phase represents the material cultural complex of the Pasitas tribes. First and foremost, there are Los Angeles remains associated with Spanish Colonial Glazed sherds at Tm c 198. This site is in a cornfield just east of the old Mission, at the present Rancho Los Angeles and on the spot that, according to José Lerma, there is a tradition of a Pasitas village. Secondly, there is ample evidence to indicate that the Los Angeles Phase is, in part, historic from the excavations in the Sierra de Tamaulipas. At Tm c 82 and Tm c 314 Spanish Colonial Glazed sherds and wheel-made sherds were associated with Los Angeles remains. Also at Tm c 82, as well as Tm c 81, with the Los Angeles remains were modern horse bones, burned, cut, ground, and scraped. Saldivar has noted that the Pasitas ate horses, thus supporting the Los Angeles–Pasitas equation for the above cave remains. Thirdly, in Pictograph Cave (Tm c 85) there are pictographs of men on horses, cattle and horses, and cattle tied together, undoubtedly the work of peoples of the Los Angeles Phase. And finally, the archaeological remains of the Los Angeles Phase and the ethnographic description by Saldivar of the material culture of the Pasitas have much in common, such as the bow-and-arrow, corn agriculture, round wattle-and-daub houses, crude pottery, the custom of eating horses, and the community

pattern of small semi-permanent villages.[48] Thus I believe it is fairly safe to conclude that the Los Angeles Phase represents at least the material culture complex of the Pasitas tribes and that the date for the extinction of the Pasitas, 1780, is a valid end-date for that phase.

Radiocarbon dating also may be brought to bear on the chronology of Los Angeles and other phases of the Sierra de Tamaulipas. C-201 from the topmost section of Layer 1 of Tm c 174 gives a date of 658 ± 150 years ago for the few associated Los Angeles remains.[49] From Layer 3 of the same cave a Carbon-14 specimen (C-687) gives a date of 4,450 ± 280 years ago for late La Perra remains.[50] And finally, carbon from Floor X of cave Tm c 81 gives a date (M-499) of 9,270 ± 500 years ago for a Lerma occupation.[51] These are the only direct dates we have on Sierra de Tamaulipas congeries. However, there are many more dates from adjacent areas that may be brought to bear upon dating the other parts of the sequence.

As has been indicated in the comparative section, the Infiernillo Phase of southwesternmost Tamaulipas seems to be just after Lerma times and before the Nogales Phase. Two carbon samples (M-498 and M-500) from Infiernillo yielded dates of 8,200 ± 450 and 8,540 ± 450.[52] As has been stated previously, early Ocampo remains from southwestern Tamaulipas are extremely closely related to late Nogales materials. There are two Carbon-14 dates for early Ocampo (M-502 and M-497)[53] 5,230 ± 350 and 5,650 ± 350 years ago. The La Perra Carbon-14 date is further confirmed by two dates from adjacent areas. Late Falcon Focus remains have been dated (by Michigan Laboratory) as 4,667 ± 300 years ago, while late Ocampo remains (M-503) have been determined as 4,580 ± 350.[54] The Flacco Phase, which is so closely related to Almagre, has yielded a date (by the Chicago Laboratory) of 3,947 ± 334.[55] The Ciengas Complex from central Coahuila, which is more tenuously related to Flacco, produced a date (M-185) of 3,622 ± 300 years ago.[56] Cultural phases closely related to Laguna in the adjacent areas are as yet undated. However, there are three dates for phases farther away and of the same general cultural stage as far as horizon-styles are concerned. One is Cuicuilco in the Valley of Mexico, with a date (C-200) of 2,428 ± 250 years ago; the second, Loma del Tepalcate from the Valley of Mexico (C-202), which was determined as 2,671 ± 200 years ago, and the other, Monte Alban I from Oaxaca, which has yielded a date (C-424) of 2,606 ± 170 years ago.[57] Eslabones is more securely dated because the Palmillas Phase of southwestern Tamaulipas, to which it is very closely related, was determined (M-506) to be in existence 1,720 ± 200 years ago.[58] Somewhat confirming this date, though the culture is somewhat distantly related, is C-426 from Monte III remains, which was 1,658 ± 185 years ago.[59] Unfortunately, there are no dates on any culture directly comparable to La Salta, but there is one that should have some bearing on it. This is a date (Y-292) of Zempoala of the just post-Classic period of the Valley of Mexico of 1,040 ± 70 years ago.[60] The cultural material of Zempoala may be correlated with the Las Flores Period (V) of the Tampico–Panuco area, which is just after the Zaquil Period (IV), which, in turn, can be connected with La Salta. Thus, La Salta may be tentatively dated at before 1,040 years ago and after 1,720 years ago, the date for Eslabones. M-501 from San Lorenzo in the Sierra Madre in Tamaulipas is of a culture very closely related to Early Los Angeles so its date, 520 ± 200 years ago, should date both complexes.

Now turning to the trade materials, the earliest trade material we have in Tamaulipas is the single Tamaulipas point with collateral flaking from the Lerma levels of Tm c 81. This would seem to fit into the general Yuma-like tradition, but at the moment it cannot be dated exactly.[61] From Itzapan with the second mammoth there is also a perfectly good Lerma point in the upper Becerra soils. Whether this is a trade point it is impossible to tell with the present limited congeries from those sites.[62] All that can be said at present is that this Lerma point occurs in the upper Becerra stratum in the Valley of Mexico, which stratum, on the basis of Carbon-14 dates, falls somewhere between 11,020 and 4,900 years ago.[63] Turning to the Nogales horizon, there is a single trade object, a Plainview point.[64] Plainview points have been dated as occurring between 7,800 and 10,400 years ago, though they may extend into slightly more recent times.[65] Thus Nogales should overlap at least in some small degree with the time period of Plainview points. The next trade object in our sequence is from the Almagre horizon in cave Tm c 315 and is a Langtry Stemmed point.[66] There is only one date known on these points, and it is 3,622 ± 300 years from Coahuila.[67] Although the Laguna, Eslabones, and La Salta horizons all have trade material in them, none of it can be dated accurately. In the hope that it may eventually be dated, I will mention it here. Laguna has El Prisco Black sherds from the Tampico–

[48] Saldivar, 1945.
[49] Libby, 1950.
[50] Libby, 1952.
[51] Crane, personal communication.
[52] *Ibid.*
[53] *Ibid.*
[54] *Ibid.*
[55] Libby, personal communication.
[56] Crane, personal communication.
[57] Libby, 1950.
[58] Crane, personal communication.
[59] Libby, 1950.
[60] Flint, personal communication.
[61] Wormington, 1946.
[62] Aveleyra, 1953.
[63] Lorenzo, 1956.
[64] Krieger, Evans, and Meade, 1947.
[65] Suhm and Krieger, 1954.
[66] *Ibid.*
[67] Taylor, personal communication.

Panuco area.[68] Eslabones has a single side-notched point made from an obsidian micro-blade similar to those found in the later periods of the Teotihuacan,[69] while La Salta has Zaquil Red and Zaquil Black Engraved sherds from the Tampico–Panuco area.[70]

In the Los Angeles horizon are a great many trade objects. Trade sherds from the Tampico–Panuco area include Panuco Grey, Tancol Black-on-White, Huasteca Black-on-White, Tancol Brown-on-Buff, Tancol Polychrome, Las Flores Incised, and Zaquil Red. There is also a spindle whorl and copper ear-spoon.[71] None of these can be exactly dated, though all of them occur in Panuco Period (VI) of the Tampico–Panuco area, which is thought to have existed between A.D. 1200 and A.D. 1520. Another sherd, probably from Arkansas, or at least the central Mississippi Valley, is Leland-Fatherland Incised and is thought to have been made between A.D. 1450 and A.D. 1600.[72] Other trade objects are three projectile points: Cameron Triangular, Toyah, and Hayes. Toyah and Cameron are known to have existed during early historic times and the late prehistoric period, while Hayes points are estimated by Krieger to occur between A.D. 800 and A.D. 1200.[73] Unfortunately no dates on any of these points are really exact.

Turning from the absolute dates and the more or less relative dates of the trade objects, we come to the relative chronology of the Tamaulipas materials. First, there are the results of studies of the geology of the Canyon Diablo area, which were made in April–May of 1949 by de Terra and Evans.

Dr. Glen L. Evans, then of the Texas Memorial Museum of Austin, Texas, accompanied by Dr. Alex Krieger, then of the Department of Anthropology of the University of Texas, visited the Canyon Diablo on May 6 to 8, 1949. I now quote Evans' report of June 6, 1949, as an introduction to the geology of the area.[74]

> Remnants of at least three alluvial terraces are preserved in Canyon Diablo and also in its tributary, Canyon Pinal, which enters Canyon Diablo from the west side at a point between site Tm c 81 and Tm c 82.
>
> The terraces are composed of rounded limestone gravels and boulders with some interstratified calcareous sands. At one good exposure of the highest terrace, near Site Tm c 82, the alluvium is well bedded and the basal gravel is firmly cemented to a hard conglomerate, while in the observed exposures of the lower terraces the alluvium is poorly sorted and uncemented. A well-developed, reddish clay soil occurs over at least a part of the highest terrace. Soils observed on the lower terraces were thin and usually of dark gray color.
>
> The alluvium of the highest terrace attains a thickness of 50 to 60 feet at the exposure near Site Tm c 82, but the number of exposures examined was inadequate to permit a determination of either average or maximum thickness. The lower terraces are relatively thin in the few exposures examined, ranging in thickness from as little as 5 feet to perhaps a maximum of 20 or 25 feet.
>
> The surface of the highest and best developed of the terraces ranges from about 45 to 70 feet above the adjacent channel, the surface of the intermediate terrace from 20 to 25 feet above the channel, and the lowest terrace 7 to 20 feet above the channel. It should be noted here, as elsewhere on steep-gradient sections of intermittent stream courses, the surface of a given terrace is not everywhere at the same elevation above the adjacent channel. This is due in part to differences in gradient between channel and terrace surfaces; to local, pronounced irregularities such as gravel bars or deep washout holes in the channel; to post-terrace accretions on the terrace surface in the form of minor alluvial fans or sheet wash from valley slopes; and to partial denudation of the terrace by erosion. Consequently, the measurement of the interval between channel and terrace surface is useful only as a means of tentative identification, especially of widely separated remnants of the higher terraces. Positive identification would require detailed mapping and close study of the terrace succession over a considerable section of the valley. Each of the terraces represents a geological sub-stage of alluviation followed by a sub-stage of renewed degradation. The duration of each sub-stage can be assumed to be roughly proportional to the extent of the alluviation, or of the valley cutting, by which the sub-stage is identified. The highest terrace, being much the thickest and most extensive, apparently represents a substantially longer period of time than do the lower and relatively minor terraces. However, the lower terraces appear to have been formed by an ephemeral stream flowing only under conditions of torrential rains or during times of unusually sustained precipitation, while the well-sorted character and distinct bedding in parts of the highest terrace indicate that it may have been formed while the canyon supported a semi-permanent stream. It is possible, therefore, that the alluvium of the highest terrace may have accumulated at a more rapid rate than did the alluvium of the lower terraces.
>
> The factors which could have influenced alternate degradation and alluviation with consequent terrace development include climatic changes, structural movements and other primary or contributing causes. The Canyon Diablo terraces are similar in their physiographic development to terrace successions in some of the intermittent streams of the southwestern United States where climatic changes have evidently been the principal cause of terrace development. In several of the southwestern United States successions referred to, the two lower terraces have been dated as Recent on the basis of archaeological, physiographic, and faunal evidence, while on the same lines of evidence the third terrace is regarded as late Pleistocene.
>
> It is not improbable that the terraces of Canyon Diablo are of approximtely the same age as the corresponding terraces in the southwestern United States, although it is obviously impossible to set up a definite correlation, either as to origin or age, merely on the basis of physiographic similarity, which could prove to be superficial. Until the Canyon Diablo terraces have been more fully studied and dated by diagnostic fossils or other trustworthy evidence, I would tentatively assign the third (highest) terrace to the late Pleistocene or early Recent. The two lower terraces can be assigned to the Recent on the basis of their position and development, but are not necessarily correlatives of corresponding Recent terraces in valleys of other regions. From evidence now available, I can see no means of arriving at a dependable popular dating, in terms of centuries or millenniums, of any of the Canyon Diablo terraces.

[68] Ekholm, 1944.
[69] Linné, 1934.
[70] Ekholm, 1944.
[71] Ekholm, 1944.
[72] *See* p. 121.
[73] Suhm and Krieger, 1954.
[74] Evans, letter.

Evans also examined the strata within cave Tm c 81 and wrote of Zone C, in which the Lerma artifacts occurred, the following:

> Calcareous sand and silt compact, massive, tannish color. . . . The character of sorting and lack of bedding in this member lead me to suspect that it was deposited by wind from an adjacent stream bed.

Zone D of Tm c 81, containing the Diablo Complex artifacts, was described by Evans as follows:

> Well rounded, stream-laid gravel with some interbedded sand, exposed only in a small section near the bottom of outer trench well. The gravel is a part of a small erosional remnant of a terrace, apparently the third terrace of Canyon Diablo. The highest point of the gravel that is definitely in place is 37 feet above the gravel and boulder bed of the present stream channel, and 27 feet above the highest level at which gravel has recently been deposited.

Dr. Helmut de Terra visited the Canyon Diablo on April 27 to 29, 1949, and also studied the geology of the area. Of it he stated the following:[75]

> Thickness of the high terrace and fairly well-rounded shape of the pebble constituent as well as the reddish coloring of the silt clay strata in the high terrace argue for a stream laid origin which under the present climate is unthinkable, particularly when the red soil and the thickness are considered. Considering further that there are lower terraces less thick and narrower and, also, that the lower terrace has no reddish soil and is a more brown silt, it would seem that the lower terrace might be of middle Recent when the moist conditions prevailed. The high terrace, therefore, might represent the last Pluvial. This assumption could be checked by . . .

De Terra, in studying Zone C of Tm c 81 in which Lerma artifacts occurred, decided that it was "a pedalfer soil . . . a B horizon soil of a humid type of climate" and the "possible time of the pedalfer soil must be quite early due to their coloring. . . . This soil might be just after the time of the terrace (the humid late Pluvial) . . . 8,000 to 12,000 years ago."

Of Zone D of Tm c 81, de Terra said the following:

> The gravels are difficult to interpret because we are on the flanks of the valley where sedimentation was varied, actually in the talus of limestone bluffs. The fact that you have stream laid gravels approximately 40 feet below suggests you have the remnant of a stream terrace but the stream terraces in the immediate neighborhood must be extensively investigated.

In addition to these earlier geological studies, the excavations and survey of 1954 added two significant facts: the Nogales remains of Tm c 314 were found to be sitting on top of the middle terrace of the Canyon Calabaza area, which in turn, may be correlated with the middle terrace of the Canyon Diablo area; and the La Perra and Almagre materials of cave Tm c 315 were in a similar position.

Now let me summarize. Both de Terra and Evans see the final period of the Canyon Diablo area as a dry one, during which time the low terrace underwent degradation. This would be preceded by a wet period, during which the low terrace had developed. From neither of their studies was it possible to tell which cultures were associated with these alluvial phases. This is equally true of the preceding period, a dry one during which the middle terrace was degradated. Previous to that there had been a wet period, at which time the middle terrace had developed. Though Evans' and de Terra's studies did not correlate the middle terrace with any culture, the work in Tm c 314 and 315 indicated that the middle terrace had been formed before Nogales times. Previous to the building of the middle terrace there was a dry period when the high terrace was being cut. Evans felt that the soils in which Lerma was found in Tm c 81 were deposited during this time. He thought that the soils in which the Lerma materials occurred was wind-blown and therefore was of a dry period, just after the formation of the high terrace. This was different from the opinion of Dr. de Terra, who felt that the Lerma materials were in a soil formed under wet conditions during the final phases of the building of the high terrace. Both de Terra and Evans agreed that the highest terrace development occurred during a wet period and that the Diablo tools were associated with it. Although both were not definite about it, they also felt this might be the Pluvial period at the end of the last period of glaciation. In both their studies their conclusions were tentative, and they recommended that by further studies these conclusions might be made more definite and that some of their differences might be cleared up. Since that time other studies have been made, and I believe some of these differences can be ironed out and more of the archaeological cultures correlated with the geological phenomena they noted.

One of these further studies was undertaken in Canada by Dr. R. de Witt, then of the Geological Survey. He submitted a series of soil samples from the Canyon Diablo to Dr. F. Lionel Peckover, then Assistant Research Officer of the National Research Council of Canada, for a grain analysis.[76] When this had been made, he submitted to me the following report:

Sample 1—Zone D of Tm c 81—

> This silt contains well-worn gravels and sand such as would be found in deposits from a fairly permanent stream. It also has fragments of angular to subangular long chert fragments which might have been brought in by man.

Sample 2—Zone C of Tm c 81—

> This soil is a "terra rosa" type, a residual product of leaching and weathering limestone. . . . The deposit will most likely have formed under moist and warm climatic conditions which were realized in the late Mankato substage or just before the post-glacial temperature optimum. . . . The silt is not plentiful or well sorted enough to indicate an Aeolian origin.

[75] de Terra, letter.

[76] Peckover, letter.

Sample 3—Zone C of Tm c 174—

This is mainly a powder limestone probably eroded from the surrounding cliffs during a dry period.

Sample 4—Upper part of Zone B of Tm c 174—

This is not unlike sample 2 except it contains small fragments of charcoal and other vegetable material.

Besides this soil analysis by the Canadian scientists, there are two other facts concerning soils that have a bearing on climatic conditions. These were revealed in caves Tm c 174 and Tm c 81. In Tm c 81, parts of the refuse of Layers 2 and 5 were cemented together by dissolved limestone. This condition is interpreted as having been caused by seepages carrying part of the lime into the refuse area. These would only have occurred during wet periods. These layers bear remains of the Eslabones and Lerma Phases. In Tm c 174, both Zones A and B, comprising the Laguna and La Perra Phases respectively, also had fingers of dissolved limestone cementing the refuse. On the other hand, it is of note that in cave Tm c 81 the Nogales Phase in Layer 3 and Los Angeles in Layer 1 do not have any occurrences of dissolved limestone and therefore would seem to be in drier periods.

Now let us consider how these soil studies supplement and implement the geological surveys. First of all, the analysis of the gravels of Layer 6 of Tm c 81 leaves no doubt that these gravels were part of the high terrace and that they and the Diablo artifacts were deposited during a very wet period. Secondly, the soils associated with Lerma from the same cave confirm de Terra's conclusion that these were deposited during a wet period. Furthermore, they are sufficiently different from the soils in the gravel to show that it is not the same wet period as that of the gravels. Thirdly, there is some evidence that Nogales and Los Angeles belong to a dry period. The lack of dissolved limestone with Nogales remains in Tm c 81 indicates this. So also do the soils of a dry period deposited in Tm c 174 between Lerma and La Perra times, which is when Nogales occurs. On the basis of the terra rosa soil as well as the dissolved limestone in Tm c 174, La Perra must be assigned to a wet period. The dissolved limestone with Laguna and Eslabones in Tm c 174 and Tm c 81 also indicates moist conditions. The lack of dissolved limestone or terra rosa soils with any Los Angeles deposit hints that it might be of a dry period.

Further evidence for the climatic conditions of the various cultural phases comes from the associated bone materials.[77] The presence of an extinct horse astragulus in the high terrace gravels under Tm c 315 suggests they were formed under different climatic conditions from those found at present. While *Mazama* and *Castor* are not ideal climatic indicators, their presence in the Lerma Period suggests a wet climate. Nogales, with *Odocoileus, Felis,* and *Nasua,* appears to be during a drier period. La Perra, Laguna, Eslabones, and La Salta show a gradual shift from the time when *Mazama* deer were dominant over *Odocoileus* to a time when *Odocoileus* is slightly more prevalent than *Mazama.* The faunal materials seem to show that from La Perra into La Salta times there was an initially moist period that gradually became drier. Los Angeles was definitely a dry period, as *Mazama* deer are almost non-existent. The floral material tends to confirm our climatic estimates for La Perra, Laguna, and Los Angeles. The presence of *Lonchocarpus hondurensis, Frocchlichia,* and *Marsdenia* in La Perra and Laguna, as well as the manioc leaf and seed in Laguna, and the relative unimportance of yucca and *sabal* show a climate slightly wetter than at present. The lack of the wet-climate plants and the increases of yucca, *sabal, opuntia,* and cacti in Los Angeles shows that, like the present, it was a very dry period.

Now the question arises: How do these six stages of alternating wet and dry periods of the Sierra de Tamaulipas correlate with like phenomena of other areas? Perhaps the newest, most reliable data come from the Valley of Mexico. There, stratigraphic, glacial, and pollen studies have been undertaken. Sears and Clisby found in their Madero core that the top two meters show alternating wet and dry conditions, the last stages being relatively dry.[78] The last stages correlate with the Nochebuena soils. Lorenzo and others, on the basis of geological data in conjunction with associated Carbon 14-dated archaeological materials, feel these soils were formed during the 2,500 years of the late half of the Medithermal.[79] Preceding this period is a somewhat wetter one, as revealed by the pollen from two to five meters. This correlates with the dark Totolzingo earth, which has been dated (W-50) as $4,900 \pm 250$ years ago, and seems to represent the earlier part of the Medithermal. In terms of the Canyon Diablo, this wet and relatively dry alternation seems to correlate with the development and dissection of the lower terrace. Flint,[80] Horberg,[81] Rubin,[82] and others, on the basis of Carbon-14 analysis, date this Medithermal period as from 5,000 to 4,500 years ago to the present.[83]

In the Madero core, the presence of distinctive pollen from 5 to 7 meters indicates a dry period. This pollen may correlate with the Barrilaco or Caliche III soils, which are considered to represent the Altithermal period.[84] The Altithermal has been dated as occurring from 4,500 or 5,000 to 7,000 or 7,500 years ago. In terms of the Canyon Diablo this would seem to fit best with the period of the cutting of the middle terrace. From 7 to 10 meters in the Madero core there is evi-

[77] *See* p. 140.

[78] Clisby and Sears, 1955.
[79] Lorenzo, 1956.
[80] Flint, 1956.
[81] Horberg, 1955.
[82] Rubin, 1956.
[83] Clisby and Sears, 1955.
[84] *Ibid.*

TABLE 31

A TENTATIVE ASSIGNMENT OF RELATIVE AND ABSOLUTE DATES TO THE CULTURAL PHASES OF THE SIERRA DE TAMAULIPAS

DATES	RELATIVE DATING						ABSOLUTE DATING			YEARS AGO
	Geological Period	Alluvial Sequence	Climate	Soils	Fauna (in order of frequencies	Flora (in order of frequencies)	CULTURAL PHASE	Carbon 14 Dates	Carbon 14 Cross-dates	Trade Objects	
1958 A.D.	M E	Dissection of Low Terrace	DRY	Cave Dust on Layer 1 of Tm c 82	Odocoileus,Equus, Aves,Lepus, Crotalus,Pecarri, Nasua,Felis, Chelonia,Mazama	Pithecelobium,Dicon,Agave,Mays,Yucca Lageneria,Sabal,Hechtia,Opuntia, Cordia Boiss.,Cucurbita p.,Cactaceae Phaseolus v.,Canavalia,Carya, Caesalpinia	LOS ANGELES	C201 658-150	M501 San Lorenzo 520-200	Spainish ware, Panuco VI sherds Leland Incised, Cameron Tri.Pt., Hayes & Toyah Pt.	178
1000 A.D.	D I	Development	MOIST		Odocoileus, Aves,Lepus, Mazama, Nasua		LA SALTA		Y292 Zemposala 1040-70	Zaquil Red and Engraved Sherds	1000
0	T H E	of		Dissolved Limestone in Layer 2 of Tm c 81	Odocoileus,Aves. Mazama,Nasua, Pecarri,Felis, Crotalus		ESLABONES		C426 Monte Alban III 1658-185 M506 Palmillas 1720-200	Teotihuacan Side-notch point	2000
	R M A L	Low Terrace	TO WET	Dissolved Limestone Layer 1 of Tm c 174	Odocoileus,Aves, Mazama,Lepus, Crotalus,Pecarri, Felis,Nasua,Chel.	Dicon,Pithecelobium,Agave,Hechtia, Bromelia,Mays,Lonchocarpus,Cordia B., Opuntia,Legume,Seteria,Sabal,Cucurb. Ungnodia,Marsdenia,Essenbechia,Yucca Froehilichia,Manihot,Carya,Lageneria	LAGUNA		C200 Cuicuilco 2428-250 C202 Tepalcate 2671-200 C424 Monte Alban I 2606-170	El Prisco Black sherds	
1000 B.C.											3000
					Mazama, Odocoileus, Aves		ALMAGRE		M185 Coahuila 3622-300 C ? Flacco 3947-334	Langtry Stemmed Point	
2000 B.C.											4000
	A L T I T H E R M A L	Dissection of Middle Terrace	DRY	Terra Rosa soils and Dissolved Limestone Layer 2 of Tm c 174	Mazama,Odocoileus Aves,Felis,Nasua, Rodentia,Pecarri, Cryphirellus Lepus,Canis, Chelonia,Crotalus	Dicon,Pithecelobium,Agave,Lonchocarp Sabal,Cordia Boiss.,Bromelia,Mays, Caesalpinia,Opuntia,Hechtia,Cucurbit Seteria,Froehilichia,Essenbeckia, Carya,Marsdenia,Cactaceae	LA PERRA	C687 4450-280	M503 Late Ocampo 4580-350 M ? Falcon 4667-300		
3000 B.C.											5000
				Cave Dust in Layer 4 of Tm c 174	Odocoileus Felis Nasua		NOGALES		M502 Ocampo 5230-350 M497 Early Ocampo 5650-350		
4000 B.C.											6000
5000 B.C.										Plainview Pt.	7000
	COCHRANE AND VALDERS ICE ADVANCES	Development of Middle Terrace	WET						M498 Infiernillo 8200-450 M500 Infiernillo 8540-450		8000
6000 B.C.											
7000 B.C.				Terra Rosa soils in layer 5 of Tm c 81	Mazama Odocoileus Castor		LERMA	M499 9270-500			9000
8000 B.C.											10000
9000 B.C.	TWO CREEKS INTERVAL	Dissection of High Terrace	DRY								11000
10000 B.C.	CARY ICE ADVANCE	Development of High Terrace	WET	Stream gravels in layer 6 Tm c 81	Equus under Tm c 315		DIABLO				12000

dence of wet conditions. These have been linked with Upper Becerra soils laid down under wet conditions in the Valley of Mexico.[85] Lorenzo considers that the formation of the Upper Becerra is contemporaneous with the Cochrane and Valders (formerly Mankato) ice advances.[86] These ice advances have been dated as between 7,000 (or 7,500) to 11,000 years ago. In the Canyon Diablo the terra rosa soils of Lerma and the

[85] de Terra, 1944.

[86] Lorenzo, 1956.

development of the Middle terrace seem most likely to be of this period. At a depth of twelve meters in the Madero core pollen indicative of a dry climate was found.[87] This correlates with the Armenta or Caliche II horizons in the Valley of Mexico dated (C-205) as 11,003 ± 500.[88] This period is thought to be contemporaneous with the Two Creeks Interval, dated as being between 11,000 and 12,000 years ago.[89] In the Canyon Diablo it is most likely the period of the cutting of the high terrace. In the Madero core at a depth of fourteen meters there is pollen of a wet period. Sears correlates this with the lower Becerra clays.[90] This period furthermore seems to correlate with a pre-Valder ice advance more than 12,000 years ago. In the Canyon Diablo, the formation of the high terrace and the associated artifacts are probably contemporaneous with the latter phenomenon.

Putting all the chronological evidence together, the wet period in which the high terrace (with the horse bone) was formed and in which the Diablo artifacts occurred seems to correlate with the pre-Valders ice advance more than 12,000 years ago. The dry period in which the high terrace was cut seems contemporaneous with the Two Creeks Interval 11,000 to 12,000 years ago.

The Lerma horizon has faunal remains (*Castor* and *Mazama*) indicative of a wet climate and has been linked with the period of development of the middle terrace. This seems to belong to the final phases of the last glaciation, from 7,500 to 11,000 years ago. The Carbon-14 date of 9,270 ± 500 for a Lerma hearth confirms this estimate. Since, typologically, Infiernillo from southwestern Tamaulipas follows Lerma and is dated as 8,540 and 8,200 ± 450, it is estimated that Lerma ended about 8,800 years ago. When this phase began is harder to ascertain, but its position in the upper part of the terra rosa soils in Layer 5 of Tm c 81 is helpful in making an estimate. Since geological correlation indicates these soils began 11,000 years ago and since the Lerma date of 9,270 comes from the upper half of these soils, I have guessed that Lerma began about 10,000 years ago. Thus Lerma may have existed between 8,800 and 10,000 years ago. Nogales remains are associated with soils and faunal materials indicative of a dry climate contemporaneous with the dissection of the middle terrace in the Sierra de Tamaulipas and the Altithermal period from 5,000 to 7,500 years ago. Cross-dates from the related early Ocampo horizons of southwestern Tamaulipas are 5,230 and 5,650, thereby confirming the above correlation. On the basis of these dates, the geological data, and the development of Nogales into the dated La Perra horizons, and end-date of 5,000 years ago seems logical. Since Nogales deposits are quite deep in Tm c 82 and sites fairly numerous, I have estimated a lengthy period for this horizon but one that does not go back to the beginning of the dry period 7,500 years ago. Therefore, the Nogales Phase is thought of as existing from 7,000 to 5,000 years ago.

La Perra soils and floral and faunal remains indicate a wet climate, while artifacts show a development from the Nogales horizon which existed during the dry Altithermal. Thus La Perra evidently began at the end of the Altithermal, roughly 5,000 years ago. Carbon-14 dates of 4,450 ± 280 on La Perra remains, 4,580 ± 350 and 4,677 ± 300 on Late Ocampo and Late Falcon respectively, have helped us in dating La Perra. I have estimated that La Perra ceased to exist about 4,200 years ago. La Perra developed into Almagre. One date of 3,947 ± 334 from the related Flacco horizon of southwestern Tamaulipas and dates of 3,600 ± and 3,400 ± for the Guerra horizon that follows Flacco would seem to show that Almagre ended by 3,500 years ago.

On the basis of soils, bone, and plant materials, Laguna, like the two previous horizons, was in a wet period when the low terrace was being formed. All three of these would be in the early part of Medithermal, from 2,000 to 5,000 years ago. Cross-dates from the Valley of Mexico and Oaxaca indicate that this horizon existed from 2,600 to 2,000 years ago. Cross-dates of 1,659 ± from Monte Alban and 1,720 ± from Palmillas allow one to estimate that the Eslabones horizon, which developed from Laguna, may have extended until 1,500 years ago. La Salta developed from Eslabones and does not seem to have lasted as late as the Tula–Mazapan horizon, dated at 1,040 years ago. The earliest date on Los Angeles is 658 ± 150 and there is considerable evidence, both from historical documents and artifacts, to show that the horizon lasted until 177 years ago. Thus it is believed that Los Angeles lasted from about A.D. 1200 to A.D. 1780. Floral and faunal evidence indicates that this was a dry period. In all probability the low terrace was being cut at this time. In the following table (table 31) the correlated data for dating the phases of the Sierra de Tamaulipas may be seen.

4. PROBLEMS AND SPECULATIONS

As a final adjunct to the descriptions and conclusions to this report, let us examine how well and how completely the objectives, defined in the introduction, have been attained. This re-examination not only may indicate the direction future investigations in Tamaulipas might take but also, on the basis of this re-examination, hypotheses or speculations may emerge that will have some relevance to archaeological investigations elsewhere.

At the outset, let me say that the background material for Tamaulipas presented in this report is extremely superficial. I was forced to rely heavily on the good

[87] Clisby and Sears, 1955.
[88] Libby, 1950.
[89] Lorenzo, 1956.
[90] Clisby and Sears, 1955.

but outdated work of Vivó [91] and Goldman.[92] I believe that considerable insight into the archaeological problems of Tamaulipas would be gained from the thorough study of the environment and ecology, with particular emphasis on the changes that have taken place. Linguistic, ethnohistorical, and ethnographical data from Tamaulipas would be most useful for reconstructing and indicating relationships of archaeological manifestations. At present such information is very inadequate in spite of the excellent preliminary work of Saldivar.[93] A linguistic study of place names and a few native words mentioned in early travelers' reports, plus what is now known of Tamaulipas' aboriginal languages, might be very informative. An anthropological analysis of explorers' reports, diaries, and documents in various churches, libraries, governmental offices, and in private collections in Tamaulipas and elsewhere would certainly yield a more complete picture of the life of Tamaulipas tribes. At the present time, Tamaulipas ethnography has the distinction of being among the poorest known in the entire New World.

Passing now to the actual archaeological work, it is readily apparent that our survey, even with 346 sites, is very limited. There were a number of things that could have been done that would have improved even this limited reconnaissance. Certainly the method of describing the sites could, and should, have been fuller and more explicit. The site designations could be improved by using a system based on map coordinance rather than political boundaries. The recording of locations of sites could have been much better if aerial photographs were utilized. As to the future, in terms of settlement pattern studies based on survey data, it might be well to take a limited area and intensively survey it systematically rather than try to cover one as large as we did. Attempts, of course, should be made to find a large number of sites for all phases as well as sites that fill in the gaps in the sequence.

The excavations left something to be desired in that they were limited and were often dug too rapidly. Perhaps the biggest fault with the excavations was that the notes (only about four hundred pages) were not always as extensive as they should have been. This, like other inadequacies of the fieldwork in such areas as photography, survey, mapping, bookkeeping, commissary, and especially the overseeing and directing of excavations, stemmed in large part from lack of sufficient technical assistance.

A problem which presented difficulties was the identification and interpretation of the "non-cultural material" associated with the archaeological remains. Most of the identifications were not accompanied by much interpretations. Thus I have been forced to make interpretations in geology, botany, and zoology, which I am ill qualified to do.

[91] Vivó, 1948.
[92] Goldman, 1951.
[93] Saldivar, 1945.

It is also, perhaps, apparent that the social implications of some of the archaeological data have not been fully exploited. Certainly a greater use of ethnographic knowledge, possibly the employment of the Human Relations Area files, could have contributed to the reconstruction of the life of the prehistoric people of Tamaulipas.

A host of historical problems posed by the Tamaulipas archaeological data at the present time cannot be answered. What are the histories of the different traits of the Sierra de Tamaulipas, their development and/or their diffusion? Why did the material culture and population of Los Angeles diminish? Why didn't the Meso-American complex that arrived in Laguna times continue to develop and reach greater heights comparable to events farther south? Where and what are the transitional steps from Almagre to Laguna? How did La Perra get its agriculture? What was the process of plant domestication and how and when did the various agricultural plants spread? Is the Nogales Phase related to the so-called "Desert Cultures" of the western United States? [94] Did Nogales develop from Lerma and, if so, why the shift from hunting to a plant-collecting economy? Does Lerma represent the northern edge of a "Paleo-Indian" complex related to or including ones farther south such as at Itzapan in the Valley of Mexico,[95] El Jobo in Venezuela,[96] the Shell Fishhook Culture of Chile,[97] Huancayo in highland Peru,[98] and related complexes in coastal Peru? What is the total artifact assemblage of the Diablo Complex? Does it represent a different tradition from the later cultural manifestations? These are but some of the historical problems that are still unanswered.

Having touched upon the subject of how well the Sierra de Tamaulipas investigations have fulfilled the secondary objectives of archaeological research, the problems concerned with them, and possible directions of future research, let us now consider what I called the primary purposes.[99] It is, of course, apparent that any attempt at generalization, when the basic historical reconstruction is relatively incomplete as it is in the Sierra de Tamaulipas, is at best speculative. But such speculations may stimulate others to test the proffered hypotheses by examination of other sequences, and by such comparative investigations these initial hypotheses may be sharpened to lead to ever more cogent propositions about the nature of cultural change.

With such purposes of archaeology in mind, I reexamined in considerable detail trends through the Sierra de Tamaulipas sequence. Trends in three general classes of archaeological phenomena seemed to have relevance to this problem in cultural dynamics. One

[94] Wauchope, 1956.
[95] Aveleyra, 1953.
[96] Cruxent and Rouse, 1956.
[97] Bird, 1943.
[98] Tschopik, 1946.
[99] *See* Chapter I, Section 1 of this publication.

was the trend in food-production, another was the trend in population concentration or size of settlements, and the final trend was in material culture.

We saw that food-production [100] as distinct from food-gathering probably started in the Nogales horizon 5,000 to 7,000 years ago, and very gradually increased to about 15 per cent by volume (of the preserved food materials) by 3,500 years ago. Then it rose sharply from 3,500 to 2,000 years ago to about 40 per cent. From 2,000 years ago to 200 years ago, it levelled off, staying between 40 and 45 per cent. Through the sequence the increment in amount of food-production was accompanied by increase in variety of domesticated plants. Ideally, a better estimate might have been made if preserved foodstuffs and samples of feces had been found at several components of every horizon. However, in light of the similarity of these trends in food-production to that found in southwestern Tamaulipas, where ideal conditions were more closely approximated, I doubt that fuller data would demand any significant change in the Sierra de Tamaulipas as calculated at present.

The incompleteness of the survey on which the trends of population concentration are based has been mentioned previously. Nevertheless, trends in size of settlements can in gross outline be determined from what knowledge is at present available from the 106 occupations or sites of the Sierra de Tamaulipas as well as from many more in the surrounding areas.[101] The earliest occupations are of the Lerma horizon. Though our sample is only seven, it is consistent and all are small temporary camps of probably 2 to 10 persons. Nogales and La Perra components are more numerous and are, in the main, seasonal camps of macro-bands though temporary camps of micro-bands occur. It is estimated that the annual average and mode of number of persons in the settlements were about 12 to 15. The Almagre horizon was slightly different, mainly because of greater use of agriculture. The components of this horizon indicate the continuance of micro- and macro-bands as the community patterning. These semi-sedentary macro-bands probably had an annual mode and average of from 15 to 20 persons per settlement. Thus in terms of the trend over the 6,000-year period from Lerma through Almagre, there was only a slow gradual increase in the annual modal size of the settlement from perhaps 6 to 20 persons.

Laguna sees a great increase in the size and variety of settlements and we have a fair sample of components. In order of frequency, they range from ceremonial centres in valleys and on hilltops (50 to 1,000 persons), hamlets or villages (50 to 100 persons), seasonal camps (20 to 50 persons), and temporary camps (2 to 10 persons). The mean number of persons annually in Laguna settlements might have been about 150 with the mode being perhaps half that much.

Eslabones and La Salta are harder to estimate because of smaller samples. For Eslabones, however, since some of the ceremonial centres are larger than those of Laguna, the range in size of settlements would perhaps be from 20 to 5,000 persons, while the annual average and mode would be only slightly larger than Laguna. La Salta, with fewer ceremonial centres, may have had less range in kind and size of settlement (2 to 500 persons) with an average of 100 persons, and the most frequent settlements perhaps having 60 persons.

Los Angeles is represented by a much larger sample of components but there is a much more limited range of types of settlements. Seasonal camps are dominant, small villages fairly common, while some temporary camps occur. However, the typical occupation is a macro-band, probably of about 40 individuals.

In terms of size of modal settlements through the sequence, one sees only a slight increase from Lerma through Almagre (9,500 to 3,800 years ago), then a rapid rise from Almagre to Laguna (from 3,800 to 2,250 years ago) and only a slight rise from Laguna to Eslabones (2,250 to 1,750 years ago). The trend in size of settlement closely parallels the trend in food-production up until this time. After Eslabones times, the trends diverge, for food-production stays about the same while settlement size decreases in La Salta times and then drops off even further during the Los Angeles Phase.

The trend in material culture is difficult to quantify precisely. Therefore, it has been necessary to fall back on the trait list and the inferred activities.

The earliest cultures, Diablo and Lerma, have a limited number of kinds of artifacts such as choppers, scrapers, and knife blades that represent activities that continued on into all the later horizons though, of course, the outward form of some of these kinds of artifacts were slightly different. Lerma initiated new artifacts such as projectile points, drills or gravers, and pebble hammerstones. Nogales saw a further increase in variety of utilitarian manufactures. Also occurring in Nogales was the first evidence of ceremonial or aesthetic activities such as the making of shell beads and the painting of pictographs. Again most of these activities continued into later horizons. La Perra initiated only the digging of refuse pits and burials with grave goods, while Almagre added the making of stone pendants, the technique of the manufacture of blades and polyhedral cores, and perhaps the more important activity, the building of wattle-and-daub houses. This incremental trend from Diablo to Almagre closely parallels the ones in food-production and size of settlements.

As in its other trends, Laguna shows a marked increase in technological activities. The manufacture of such utilitarian artifacts as roller manos, metates, bark beaters, spindle whorls, loom-woven cloth, pottery with brushed, smoothed, or burnished surfaces starts in this time and continues through the Los Angeles Phase. Many of the artifacts initiated in the Laguna Phase last

[100] *See* Chapter III, Section 15.
[101] *See* Chapter III, Section 14.

only through the La Salta Phase. Directly utilitarian traits would be celts, *tanques*, terraces, masonry house-platforms, and perhaps the carinated bowls and molcajete vessels. Of a more aesthetic or ceremonial nature would be pyramids (both round and rectangular in floor plan), plazas, specialized vessel forms such as ladies, plates, and effigy pots, and a host of specialized ceramic decorative techniques such as painting (red, black, and brown), polishing the exteriors of vessels, incising the interiors of bowls and engraving the exteriors by a number of design motifs. Laguna and Eslabones share a few unique traits. Of these only the adze is directly utilitarian; the modeled figurines, jade beads, clay beads, clay rattles, whistles, and the practice of bundle burials with grave goods in cemeteries are not. Eslabones has only a few innovations unique to it, all of which seem to have ceremonial or aesthetic significance. These are ball courts, pyramids with painted plastered exteriors, a clay flute, and mold-made figurines, the latter continuing into La Salta times. La Salta sees no new material culture activities being added and the loss of a great many of the old ones, particularly in the realm of aesthetics and ceremonialism.

This somewhat regressive trend initiated in La Salta is much more noticeable in Los Angeles. Almost all the aesthetic or ceremonial activities disappear as do some of the utilitarian ones. There do seem to be two new activities added in this final period, the manufacture of bows and arrows and the smoking complex and its accoutrements. However, these two additions are greatly outnumbered by the losses.

To review briefly the trend in material culture activities, there seems to have been a slow gradual increase from Diablo through Almagre, then a sharp rise in Laguna times which reaches the peak in the Eslabones Phase. The course of these increments correlates in the main with those in food-production and size of settlements. However, after Eslabones times there is a decrease in material culture activities. During this period of decrease, it is particularly noticeable that it is those remains connoting ceremonial and aesthetic concerns which take the greatest decline. This decline parallels the decline in size of settlement during this period but, rather surprisingly, the food-production trend shows no decline.

This course of socio-cultural events in prehistoric Tamaulipas suggests: *in at least cultures at the Formative stage,*[102] *a decline in size of settlement will see a correlative decline in ceremonial and aesthetic features as evidenced in the material remains.* Now the question becomes, does the evidence from other archaeological sequences support this trial formulation of a regularity in cultural change under specific conditions—a multilinear evolutionary generalization?[103] At present many of the crucial comparative data are not complete nor is my knowledge wide enough to come to any final conclusion. There are, however, hints of the occurrence of a similar cultural process in other areas. I shall touch upon a few with the hope that some of the experts from these other areas may be stimulated to test the proposed hypothesis.

The first relevant region that may be compared with Tamaulipas is the Hohokam area of southwest Arizona. Dr. Haury of the University of Arizona,[104] Mr. Gladwin of Gila Pueblo Foundation,[105] and Dr. Di Peso of the Amerindian Foundation[106] have established a long sequence of culture with evidence of cultural continuity. Dr. Di Peso does not believe there is continuity but the other two archaeologists believe there is, and from their evidence, I would be inclined to agree with them.

Briefly, their discoveries are as follows: the earliest culture (before 4000 B.C.) seems to be an extension of the California hunters (Amargosa) or the Sulphur Springs stage of Cochise. These people seem to have lived in small groups (semi-nomadic macro-bands) with a complex of utilitarian tools including scrapers, points, mortars and the like, with little evidence of any ceremonial or aesthetic elaboration. This phase gradually developed into Chiricahua (2000 to 4000 B.C.) which seems to have had a subsistence based on hunting and gathering and perhaps a community patterning that included seasonal macro-bands. The activities evidenced by the material culture were not greatly different from those of their predecessors though there is more emphasis on grinding tools such as manos, metates, and mullers. San Pedro (2000 B.C. to the time of Christ) is a further development of this phase with few changes in material culture. However, there is proof of more permanent habitations in that small pit-house villages occur (implying semi-permanent villages). The excavations from Bat Cave also may be interpreted as showing incipient corn agriculture practiced along with hunting and gathering. The next stages, characterized by the Pioneer and Colonial Periods, sees more agriculture, semi-permanent villages, and a host of new kinds of artifacts such as pottery, bows and arrows, mortars and the like, evidencing a noticeable increase in technological activities. This growth reached its apex in the Sedentary or late Colonial Periods, which reveal large settlements that include ceremonial structures such as compounds, ball courts, pyramids, plazas, and the like. These phases also show the greatest diversity of artifact forms and the most elaborately decorated material in the sequence. Agriculture seems to have been yet more intensive, to judge by the considerable irrigation practiced. The following Classic Period shows smaller settlements, and, although many of the technological activities advance, the ceremonial features are less frequent and the artifacts less ornate. The era following the Classic is relatively unknown and seems to be one of transition into eventually the period of the early

[102] *See* Steward, 1955: 191–192, for definition of Formative.
[103] Steward, 1953.
[104] Haury, 1950.
[105] Gladwin, 1937*a*.
[106] Di Peso, 1956.

historic Pima and Papago remains. The early historic period shows groups who practiced agriculture as did those of the earlier periods, peoples who lived in "rancheros" or semi-permanent villages without outstanding ceremonial structures and had a less ornate material culture than the previous period. Thus, like the Sierra de Tamaulipas, the Hohokam area shows a slow gradual development for a long period (6000 B.C. to the time of Christ), then a rapid development with concurrent peaks in the agricultural practices, the size of settlements, and the elaboration of material culture, especially in its aesthetic and ceremonial connotation. Then there is a decline in settlement size and a concomitant regression in the aesthetic and ceremonial manifestations in the material culture but with the subsistence pattern little changed. The Cohonina area of northwestern Arizona, as revealed in the recent studies by Schwartz, shows a set of trends very similar to those of Tamaulipas and Hohokam, although the temporal phrasing and material culture are somewhat different.[107]

Another region in which there has been enough investigation to suggest a somewhat comparable sequence is in the Caribbean Sea area, specifically on the island of Puerto Rico. Here Rouse[108] and others have established a sequence of phases that occupy a four-period time scale. The earliest phase which can be identified tribally began in Period IIA when the people of the Cuevas Phase invaded the island and settled along its coast. These people lived in settlements of either semi-permanent villages or communities of sedentary macro-bands with a subsistence based on hunting and fishing, perhaps supplemented by a little agriculture. This material culture was relatively advanced with red-on-white pottery and shell and stone tools, but there is little evidence of ceremonial or sophisticated art. This culture gradually developed into the Ostiones Phase of Period IIIA, which had a more developed material culture including modelled-incised pottery, some new stone and shell tools, large semi-permanent villages, and definite agricultural activities. During the later part of this period (IIIB), the Santa Elena Phase developed. At this time there seems to have been a shift toward the inland part of the island. This spatial shift was accompanied by an increased amount of agriculture and the development of a ceremonial complex with temples and ball courts. The villages seem to have been oriented around these ceremonial centres. This development seems to have reached its climax either late in Period IIIB or in the earlier part of Period IV. This was the apogee of population concentration, aesthetics and ceremonialism. During the latter part of Period IV in the Esperanza Phase and during historic times, though agriculture practices may have advanced, the size of settlements decreased (perhaps owing to the warlike incursions of the Arawak), and artistic and ceremonial pursuits seem to have diminished.

A few other sequences casually known to me suggest a similar process but the archaeological information (and my knowledge thereof) is too incomplete to allow for profitable summation here. To toss one final baby to the wolves—Do the Swiss Lake Dwellers evince a similar cultural process in the apparent concomitant increase in settlement size and material activities from the Mesolithic through the Early Neolithic and a degeneration in both aspects in the Middle and Late Neolithic Periods?[109]

[107] Schwartz, 1956.
[108] Rouse, 1952 and 1956.
[109] Childe, 1925.

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